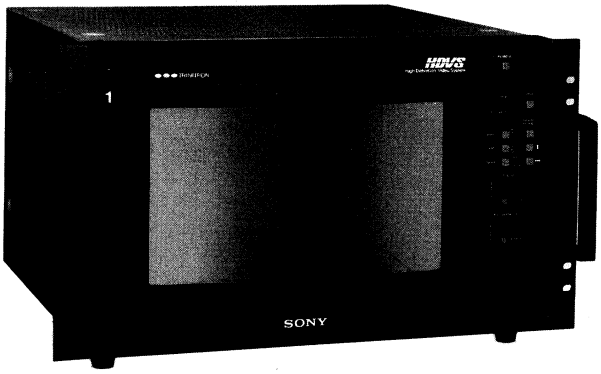
SONY®

HD TRINITRON® COLOR MONITOR

HDM-1230
HDM-1230E



TRINITRON
HDVS
1
SONY

HDVS

OPERATION AND MAINTENANCE MANUAL
1st Edition (Revised 2)
Serial No. 2000001 and Higher (HDM-1230)
Serial No. 2000001 and Higher (HDM-1230E)

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You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

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This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

Pour les utilisateurs au Canada

Cet appareil est conforme aux normes Classe A pour bruits radioélectriques, spécifiés dans le Règlement sur le brouillage radioélectrique.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ! ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

ATTENTION AU COMPOSANT AYANT RAPPORT A LA SÉCURITÉ!!

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE ! SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY. LES RÉGLAGES DU CIRCUIT QUI SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNMENT SONT IDENTIFIÉS DANS CE MANUEL. SUIVRE LES PROCÉDURES QUAND LES COMPOSANTS CRITIQUES SONT REMPLACÉS OU LE FONCTIONNEMENT IMPROPRE EST SUSPECTÉ.

CAUTION!!

DO NOT USE THE EXTERNAL DEGAUSSER TO DEMAGNETIZE THE SCREEN.
BE SURE TO USE THE DEGAUSS SWITCH ON THE FRONT PANEL.

ATTENTION!!

NE PAS UTILISER DE DÉMAGNÉTISEUR EXTÉRITUR POUR DÉMAGNÉTISER L'ÉCRAN.
UTILISER LA TOUCH DE DÉMAGNÉTISATION (DEGAUSS) SUR LE PANNEAU FRONTAL.

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SECTION 1 OPERATION

1-1. Overview

The HDM-1230/1230E is a 12-inch color video monitor for the high definition video systems (HDVS) which conform to the BTA/SMPTE standard.

Adaptable to a variety of input signal format

BTA/SMPTE standard

The monitor has a 16:9 aspect ratio and uses the tri-level bipolar sync, which conforms to the BTA/SMPTE standard, and can receive the BTA S-001/SMPTE 240M standard YPBPR signal or GBR signal.

Other input signal formats

Besides the BTA/SMPTE standard signal, the monitor can receive the preceding HDVS format signal*.

Two sets of input connectors

The monitor is supplied with two input channels, A and B. You can select either one with the INPUT selector.

High quality picture

Flat and square screen

The Super Fine Pitch Trinitron picture tube of the monitor has an almost flat surface and a squarely cornered screen. It provides a clear picture on the entire screen.

High picture resolution

The Super Fine Pitch Trinitron picture tube, which has a 0.26 mm phosphor trio pitch, realizes more than 600 TV lines of horizontal resolution.

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* RGB signal with a 5:3 aspect ratio
(When the preceding HDVS format signal is input, small pedestal areas (black areas) appear on the right and left of an HD picture.)

Multiple adjustment functions

Sub-control panel in the drawer

On the sub-control panel in the monitor, there are an aperture control, input mode selector, contrast and brightness preset controls, picture distortion controls, convergence control, color temperature control, and other controls to adjust the picture.

Seven types of test signals

The built-in test signal generator generates seven test signals; HATCH, HATCH INVERT, DOTS, SET UP, GRAY SCALE, FLAT FIELD and PLUGE* signals, for checking the monitor.

Convergence adjustment

The screen is divided into 9 parts, and the convergence of each part is adjusted by the corresponding control. Fine and easy adjustment is possible over all the screen.

Color temperature adjustment

Preset or manually adjusted color temperature is selected by the color temperature switch.

Advanced adjustment circuitry

Aperture compensation

The aperture adjustment circuitry adjusts only the Y signal decoded from a YP_BP_R signal or a GBR signal.

Stable color temperature

Both the beam detector and the pulse adder control the black level, brightness and contrast to keep the color temperature stable for a long time.

Excellent focus characteristics

The electrostatic convergence adjustment circuit, and horizontal and vertical dynamic focus circuit provide an optimum focus over the entire screen.

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* PLUGE=Picture Line Up Generating Equipment

Others

Internal or external sync signal which is selectable

You can select the internal sync signal or an external sync signal fed to the EXT SYNC connector with the SYNC selector. If horizontal and vertical sync signals are fed to the HD and VD connectors respectively, these signals will be selected.

Sync signal display

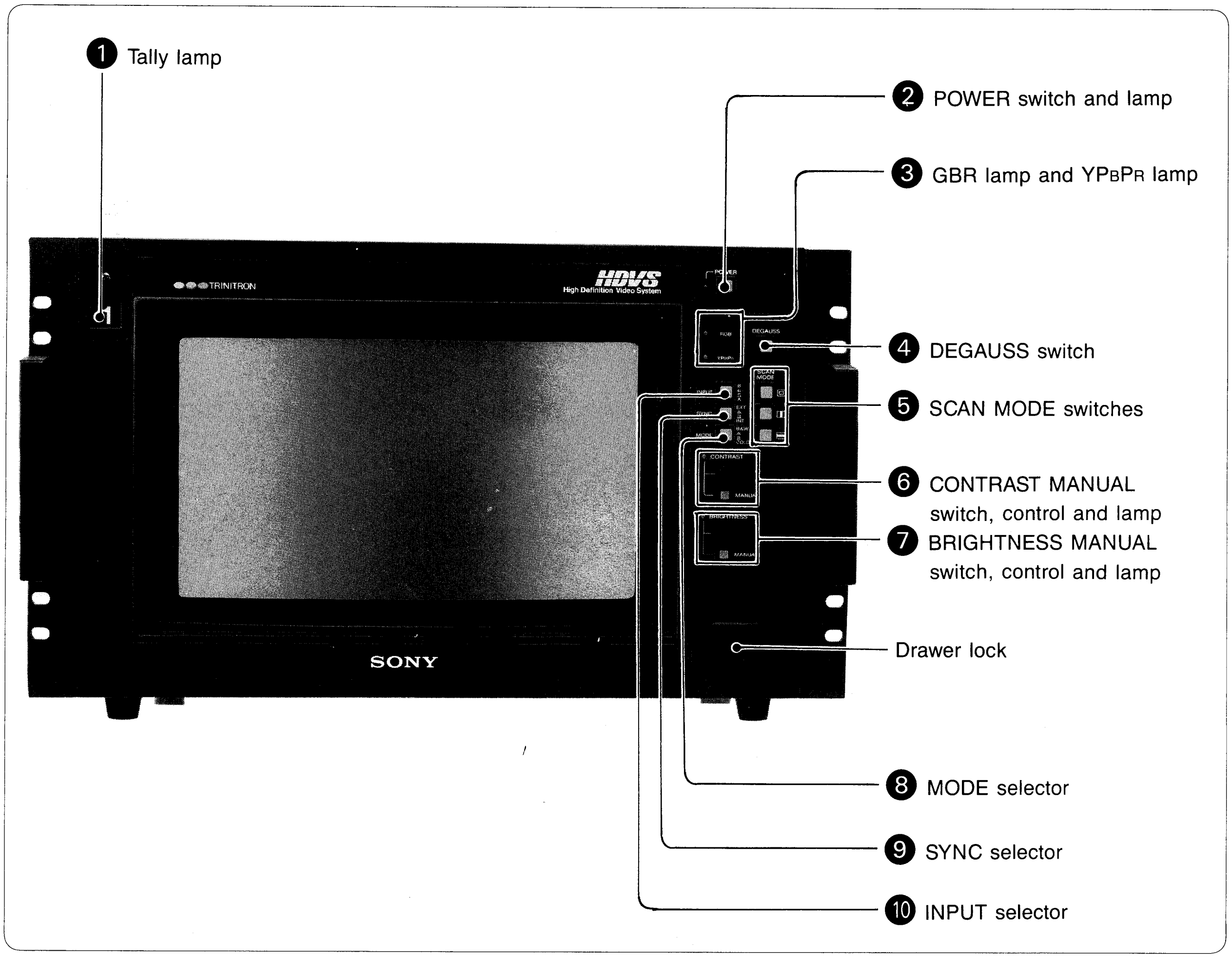
When you press the H delay switch, the horizontal sync signal appears at one-quarter of the screen width from the left of the screen, and when you press the V delay switch, the vertical sync signal appears in the center. To monitor both signals as pulse-cross signal, press both switches.

EIA standard 19-inch rack mounting possible

The optional SLR-102 slide rails can be attached to the left and right sides of the monitor. This allows the monitor to be mounted in a 19-inch standard rack.

1-2. Location and Functions of Parts and Controls

1-2-1. Front Panel


❶ Tally lamp
❷ POWER switch and lamp
❸ GBR lamp and YPBPR lamp
TRINITRON
HDVS
High Definition Video System
POWER
GBR
YPBPR
DEGAUSS
SCAN MODE
INPUT
SYNC
MODE
CONTRAST
MANUAL
BRIGHTNESS
MANUAL
SONY
❹ DEGAUSS switch
❺ SCAN MODE switches
❻ CONTRAST MANUAL switch, control and lamp
❼ BRIGHTNESS MANUAL switch, control and lamp
Drawer lock
❽ MODE selector
❾ SYNC selector
❿ INPUT selector

❶ **Tally lamp**

When the TALLY switch on the sub-control panel is set to ON, this lamp lights while the power of the monitor is on. When the TALLY switch is set to OFF, this lamp does not light.

Remove the cover using a screwdriver, and insert the supplied number plate of choice.

❷ **POWER switch and lamp**

Press to turn on the unit. When power is turned on, the lamp lights and the automatic degaussing circuit is activated to demagnetize the picture tube. The picture will not be stable for about 5 seconds until degaussing is completed.

❸ **GBR lamp and YPBPR lamp**

The appropriate lamp lights to indicate the mode of the input signal selected by the INPUT selector ❿. The input mode is selected by the mode switches on the JA board.

❹ **DEGAUSS switch**

Press this switch with the unit turned on to degauss the picture tube. This switch does not operate when pressed again right after degaussing has been made. Wait five minutes before degaussing again.

❺ **SCAN MODE switches**

⊡ **(underscan mode) switch:** Press this switch for 3% underscanning. The display size is reduced by approximately 8% and the signal normally scanned outside of the screen is displayed on the screen.

◫ **(H delay scan mode) switch:** Press this switch to monitor the horizontal sync signal. The picture moves right and the sync signal appears at one-quarter of the screen width from the left of the screen. At this time, the pedestal of the picture increases.

⊟ **(V delay scan mode) switch:** Press this switch to monitor the vertical sync signal. The picture moves down and the sync signal appears in the center of the screen. At this time, the pedestal of the picture increases.

- When you press both the ◫ and ⊟ switches, the picture displays pulse-cross.
- To retrieve the previous mode, press the switch again.

❻ **CONTRAST MANUAL switch, control and lamp**

Press the switch (the lamp lights) and turn the control to adjust the contrast of the picture. When the lamp is not lit, the contrast becomes the preset level which has been set by the PRESET CONT control on the JA board.

❼ **BRIGHTNESS MANUAL switch, control and lamp**

Press the switch (the lamp lights) and turn the control to adjust the brightness of the picture. When the lamp is not lit, the brightness becomes the preset level which has been set by the PRESET BRIGHT control on the JA board.

❽ **MODE selector**

⎍ **COLOR:** To use the monitor in color mode. Normally select this setting.

▭ **B & W:** To set the monitor to black and white operation.

❾ **SYNC selector**

⎍ **INT:** To use the composite sync signal supplied with the G signal of the GBR signal, or with the Y signal of the YPBPR signal.

▭ **EXT:** To use an external sync signal fed to the EXT SYNC connector.

The HD and VD signals, if they are supplied to the HD and VD connectors, are used regardless of the switch setting.

❿ **INPUT selector**

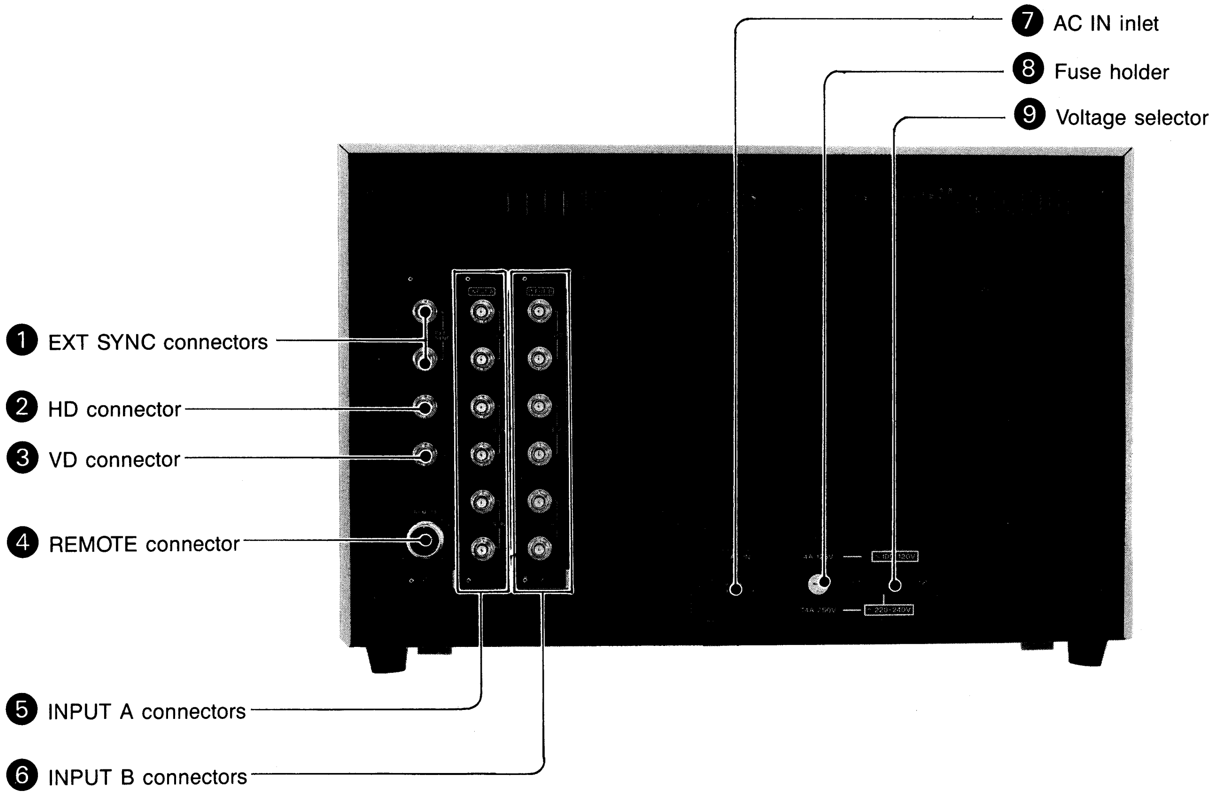
⎍ **A:** To monitor the signal fed to the INPUT A connectors.

▭ **B:** To monitor the signal fed to the INPUT B connectors.

The phase of the input signal can be selected by the H PHASE switches, 16:9 or 5:3, on the I board of the sub-control panel according to the standards of the input signal. The standards of the input signal can be set for INPUT A and B respectively.

⎍ indicates that the switch is not depressed and
▭ indicates that it is depressed.

1-2-2. Rear Panel


❼ AC IN inlet
❽ Fuse holder
❾ Voltage selector
❶ EXT SYNC connectors
❷ HD connector
❸ VD connector
❹ REMOTE connector
❺ INPUT A connectors
❻ INPUT B connectors

❶ **EXT (external) SYNC connectors** (BNC)
External sync signal (composite) input. One of the two connectors is used for a bridging connection. If you do not use it, attach the supplied 75-ohm termination plug.

❷ **HD (horizontal drive) connector** (BNC)
External horizontal sync signal input. (The input signal is terminated with 75-ohms inside.)

❸ **VD (vertical drive) connector** (BNC)
External vertical sync signal input. (The input signal is terminated with 75-ohms inside.)

❹ **REMOTE connector** (10 pin)

Pin No.	Signal		Pin No.	Signal
	OPEN	GND		
1	COLOR	B & W	6	GND
2	INPUT A	B	7	—
3	TALLY OFF	ON	8	—
4	SYNC INT	EXT	9	—
5	LOCAL	REMOTE	10	—

To remotely control the unit, use the supplied remote connector.
For remote control, set pin No. 5 to GND, and set pin No. 1 through 4 to OPEN or GND according to the desired setting. (Pin No. 6 is connected to GND in the unit. So to ground pin No. 1 through 5, connect it to pin No. 6.) In memory control mode, setting of the MODE selector ❽, SYNC selector ❾ and INPUT selector ❿ on the front panel and the TALLY switch on the sub-control panel will become ineffective.
If you set pin No. 5 to OPEN, the remote control operation will become ineffective.

❺ **INPUT A connectors** (BNC)

❻ **INPUT B connectors** (BNC)
HDVS signals can be input. To select which input signals, A or B, to monitor, press the INPUT selector on the front panel.
Each input has a connector for a bridging connection. If you do not use the connector for the bridging connection, attach the supplied 75-ohm termination plug.

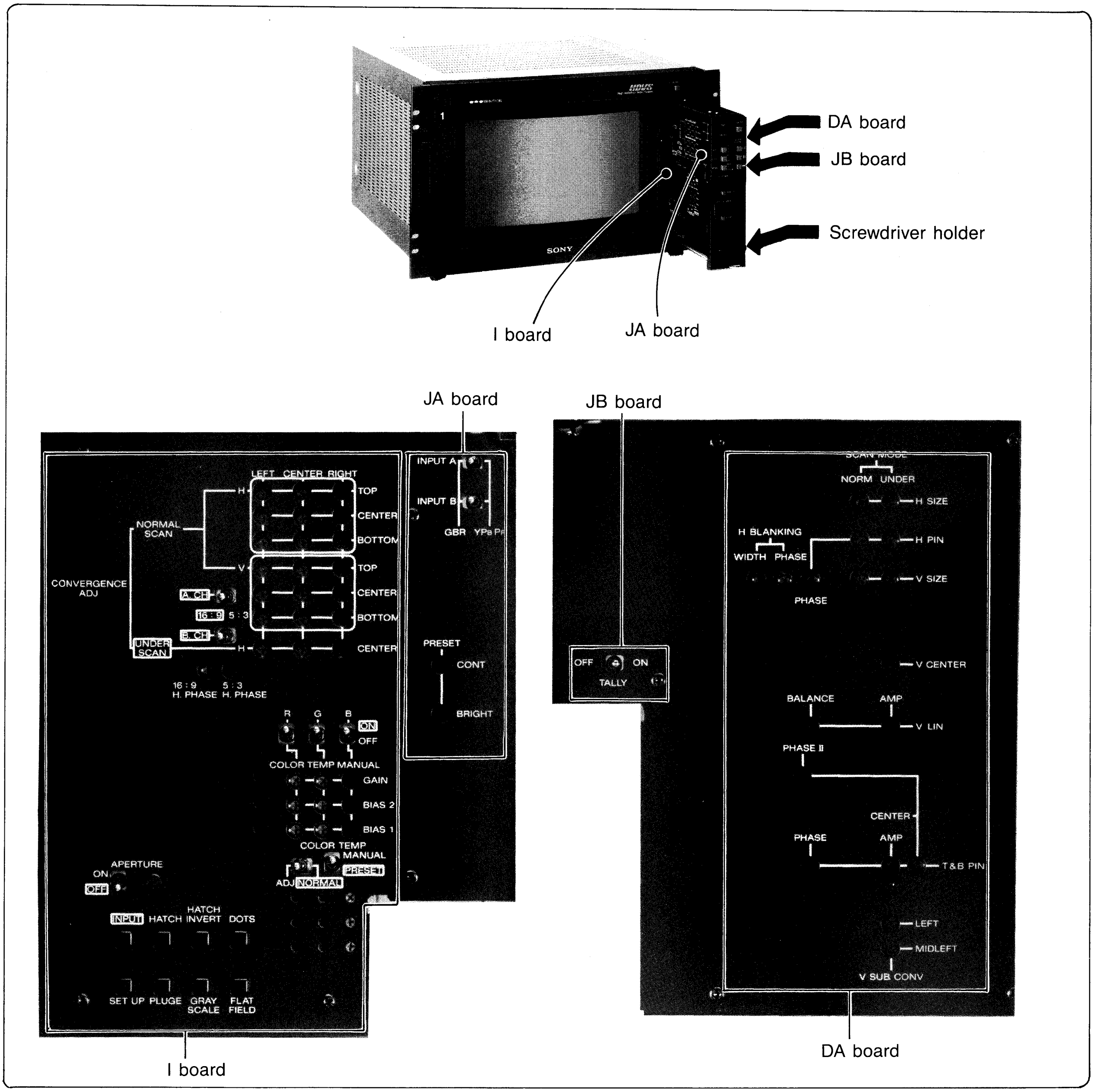
❼ **AC IN inlet**
Connect the supplied AC power cord. If necessary, fix the power cord with the supplied cord stopper. (See "1-3-2. Connection example".)

❽ **Fuse holder**
Use a 4.0A fuse for operation on 100 – 120V AC, or a T4A fuse for operation on 220 – 240V AC.

❾ **Voltage selector**
Set to the local power line voltage, 100 – 120V AC or 220 – 240V AC.

1-2-3. Sub-Control Panel

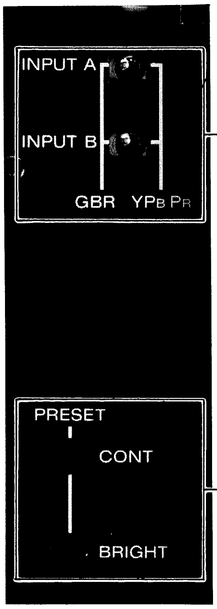
Insert the supplied key into the drawer keyhole, turn it 90° clockwise and pull the drawer out.


DA board
JB board
Screwdriver holder
I board
JA board
JA board
JB board
LEFT CENTER RIGHT
H
TOP
CENTER
BOTTOM
NORMAL SCAN
V
CONVERGENCE ADJ
A CH
16 : 9
5 : 3
B CH
UNDER SCAN
16 : 9 H. PHASE
5 : 3 H. PHASE
R G B
ON
OFF
COLOR TEMP MANUAL
GAIN
BIAS 2
BIAS 1
COLOR TEMP
MANUAL
PRESET
ADJ
NORMAL
APERTURE
ON
OFF
INPUT
HATCH
HATCH INVERT
DOTS
SET UP
PLUGE
GRAY SCALE
FLAT FIELD
INPUT A
INPUT B
GBR
YPBPR
PRESET
CONT
BRIGHT
OFF
ON
TALLY
SCAN MODE
NORM
UNDER
H SIZE
H BLANKING
WIDTH
PHASE
H PIN
V SIZE
PHASE
V CENTER
BALANCE
AMP
V LIN
PHASE II
CENTER
PHASE
AMP
T&B PIN
LEFT
MIDLEFT
V SUB CONV
DA board
I board

Notes

- To adjust the unit with the controls on the sub-control panel, give more than 30 minutes after the power is turned on to fully warm up the unit.
- To adjust the controls, use the supplied screwdriver. The supplied screwdriver can be stored in a screwdriver holder on the sub-control panel. Do not store it during transportation.

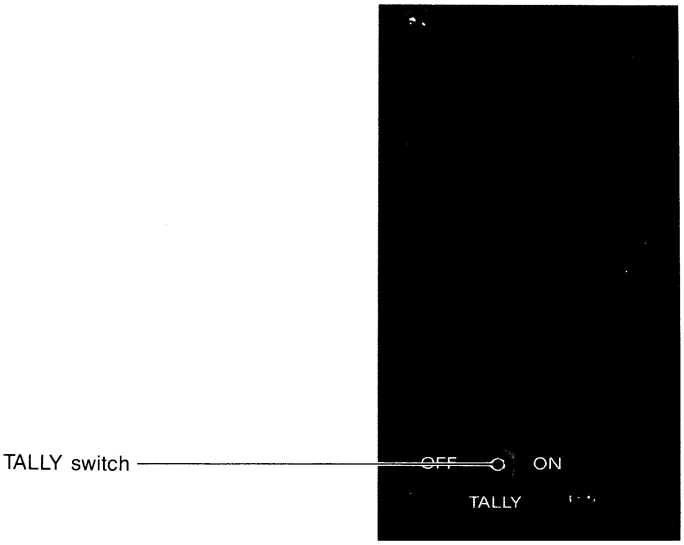
JA board (brightness and contrast adjustment and input mode selection)


INPUT A
INPUT B
GBR
YPB PR
PRESET
CONT
BRIGHT
① Mode switches
② PRESET control block

① **Mode switches**
Set each switch to an appropriate position, GBR or YPBPR, depending on the mode of the input signals fed to the INPUT A or B connectors. The mode of the input signal selected by the INPUT selector on the front panel is indicated by the GBR or YPBPR lamp on the front panel.

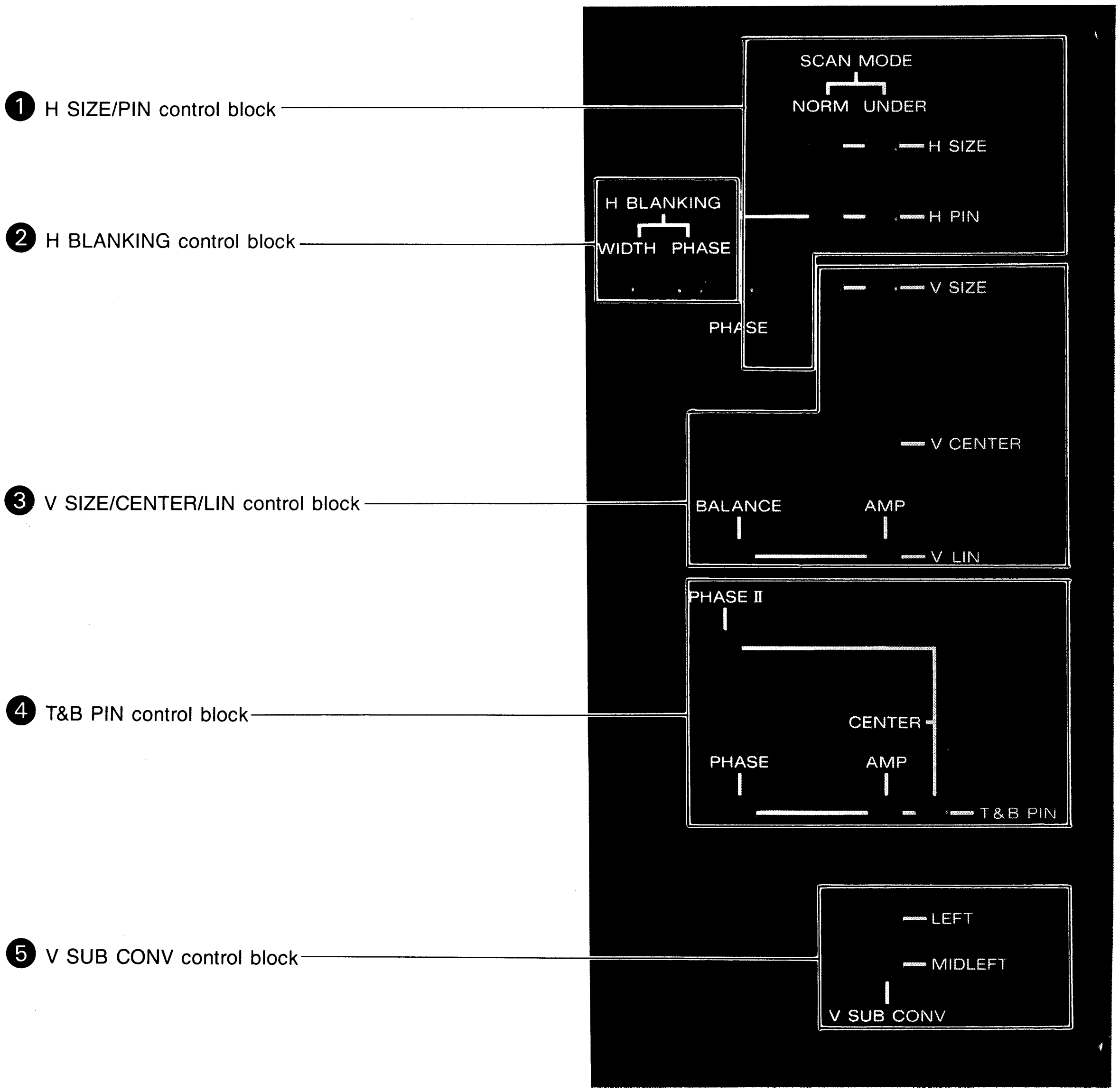
② **PRESET control block**
BRIGHT: Preset the brightness of the screen.
CONT (contrast): Preset the contrast of the screen.
When the BRIGHTNESS MANUAL switch and the CONTRAST MANUAL switch on the front panel are set to OFF, brightness and contrast become the level set by the controls in the PRESET control block.

JB board


TALLY switch
OFF
ON
TALLY

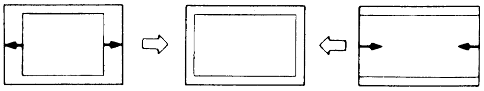
TALLY switch
By setting this switch to ON, the tally lamp on the front panel lights when the power is on. When this switch is set to OFF, the tally lamp does not light.

DA board (picture distortion and sub convergence adjustment)

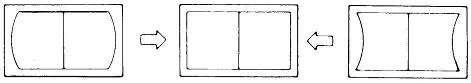

① H SIZE/PIN control block
② H BLANKING control block
③ V SIZE/CENTER/LIN control block
④ T&B PIN control block
⑤ V SUB CONV control block
SCAN MODE
NORM
UNDER
H SIZE
H BLANKING
WIDTH
PHASE
H PIN
V SIZE
PHASE
V CENTER
BALANCE
AMP
V LIN
PHASE II
CENTER
PHASE
AMP
T&B PIN
LEFT
MIDLEFT
V SUB CONV

❶ H SIZE/PIN (horizontal size/pincushion) control block

H SIZE (horizontal size)
Used to adjust the horizontal size of the picture.

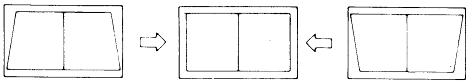


H PIN (horizontal pincushion)
Used to adjust the pincushion distortion at the sides.



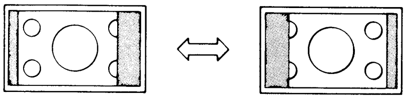
Note
Adjust the H SIZE and H PIN using the NORM control in normal scan mode or the UNDER control in underscan mode according to the setting of the SCAN MODE ☐ switch on the front panel.

H PIN PHASE (horizontal pincushion phase)
Used to adjust the phase of the pincushion distortion at the sides of the picture.

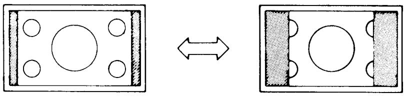


❷ H BLANKING (horizontal blanking) control block

PHASE
Used to adjust the phase of the horizontal blanking.

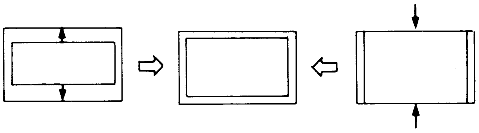


WIDTH
Used to adjust the width of the horizontal blanking.

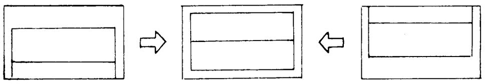


③ V SIZE/CENTER/LIN (vertical size/centering/linearity) control block

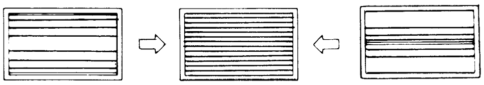
V SIZE (vertical size)
Used to adjust the vertical size of the picture.
Adjust it using NORM control in normal scan mode or the UNDER control in underscan mode.



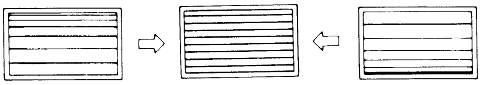
V CENTER (vertical centering)
Used to adjust the vertical position of the picture.



V LIN (vertical linearity) AMP
Used to adjust the vertical linearity of the picture.

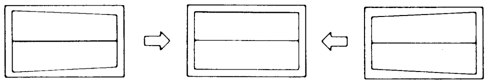


V LIN (vertical linearity) BALANCE
Used to adjust the vertical linearity balance of the picture.

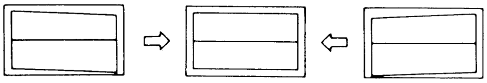


④ T & B PIN (top & bottom pincushion) control block
Used to adjust the top and bottom pincushion distortion.

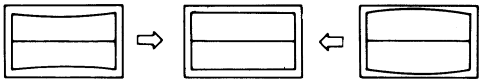
PHASE



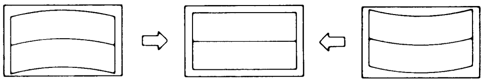
PHASE II



AMP



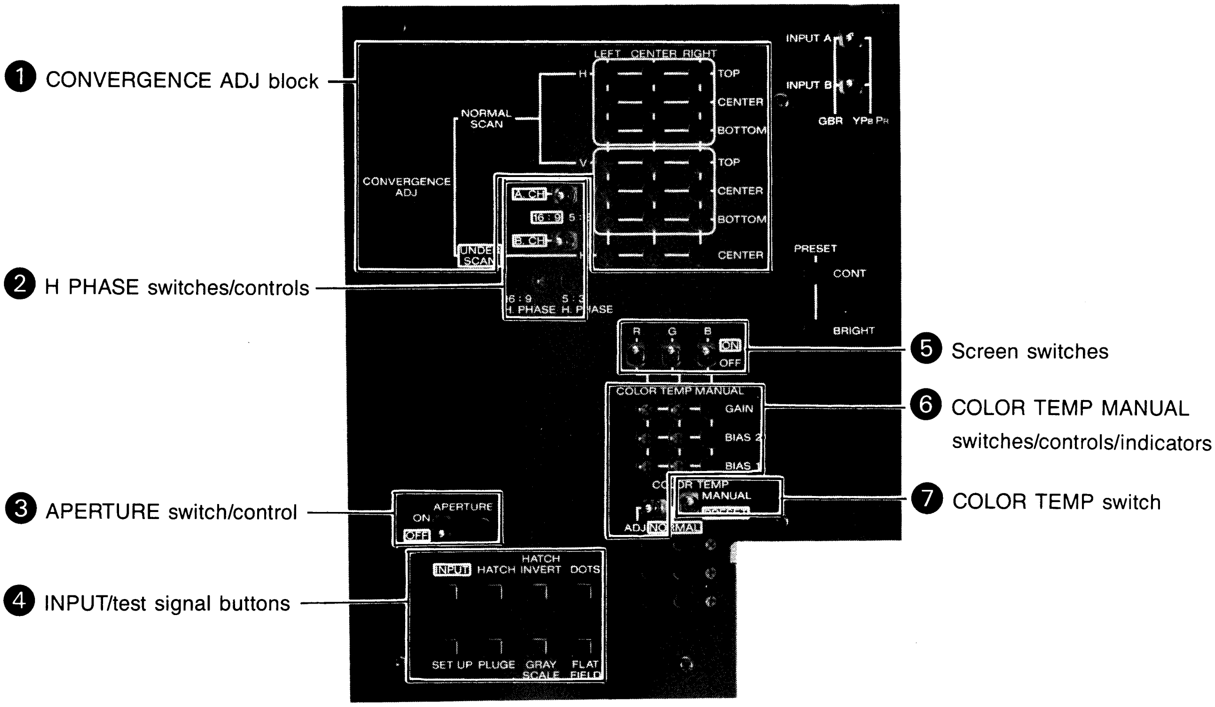
CENTER (centering)



The top and bottom and the center (X-axis) of the screen move simultaneously.

⑤ V SUB CONV (vertical sub convergence) control block
Used to adjust the vertical sub convergence. (See "1-4-2. Adjusting convergence".)

I board (convergence and color temperature adjustment and internal test signal monitoring)


❶ CONVERGENCE ADJ block
❷ H PHASE switches/controls
❸ APERTURE switch/control
❹ INPUT/test signal buttons
❺ Screen switches
❻ COLOR TEMP MANUAL switches/controls/indicators
❼ COLOR TEMP switch
LEFT CENTER RIGHT
H
V
TOP
CENTER
BOTTOM
NORMAL SCAN
CONVERGENCE ADJ
UNDER SCAN
A CH
16:9
5:3
B CH
H. PHASE
INPUT A
INPUT B
GBR
YPBPR
PRESET
CONT
BRIGHT
R
G
B
ON
OFF
COLOR TEMP MANUAL
GAIN
BIAS
COLOR TEMP
MANUAL
ADJ
NORMAL
APERTURE
ON
OFF
HATCH
INPUT
HATCH INVERT
DOTS
SET UP
PLUGE
GRAY SCALE
FLAT FIELD

❶ CONVERGENCE ADJ (convergence adjustment) block
Adjust the convergence using the NORMAL SCAN control in normal scan mode or the UNDERSCAN control in underscan mode. (See "1-4-2. Adjusting convergence".)

❷ H PHASE (horizontal phase) switches/controls
Set the H PHASE switch to 16:9 for the new standard (BTA/SMPTE standard) or to 5:3 for the preceding standard according to the input signal. The A CH and B CH switches correspond to the input signals fed to the INPUT A and B connectors.
Adjust the horizontal phase using the H PHASE control, 16:9 or 5:3, corresponding to the standards of the input signal.

❸ APERTURE switch/control
When this switch is set to OFF, a flat frequency response is obtained. For contour compensation of the picture, set the switch to MANUAL and turn the control. (The APERTURE switch and control are effective in either RGB or YPBPR mode.)

❹ INPUT/test signal buttons
INPUT button: The signal fed to the INPUT A or INPUT B connector of the rear panel is displayed on the screen. Select the input signal with the INPUT selector on the front panel.
Test signal buttons: The test signal generated by the built-in signal generator is displayed on the screen. Seven types of test signals, HATCH, HATCH INVERT, DOTS, SET UP, PLUGE, GRAY SCALE, FLAT FIELD are generated. (See "1-4-3. Checking the unit with the internal test signals".)

❺ Screen switches

The R (red), G (green) and B (blue) switches turn the red, green and blue beams on and off respectively.

To monitor a single color during color temperature adjustment, set the corresponding switch to ON and set the others to OFF.

❻ COLOR TEMP MANUAL (color temperature manual) switch/controls/indicators

Used to adjust the color temperature. (See "1-4-1. Adjusting color temperature".) The indicators light when the COLOR TEMP switch is set to MANUAL.

Normally set the ADJ switch to NORMAL.

❼ COLOR TEMP (color temperature) switch

Select the factory preset color temperature or manually adjusted temperature.

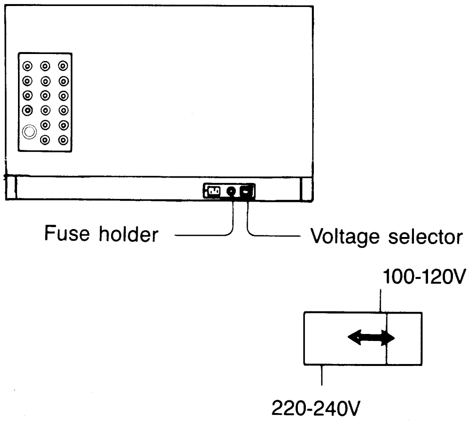
PRESET: The factory preset color temperature D65 (6500K + 8MPCD) is selected. The preset value can be changed (see "Color temperature adjustment" in Section 4); however, it is not recommended to change it.

MANUAL: The color temperature can be adjusted with this switch and the COLOR TEMP MANUAL controls ❻.

1-3. Operating Voltage Selection and Connection

1-3-1. Operating Voltage Selection

The HDM-1230/1230E can operate on either 100-120 or 220-240V AC by selecting the operating voltage with the voltage selector. Before plugging in the unit, make sure that the voltage selector is set to the local power line voltage. Change the setting of the voltage selector, if necessary. Before you change the setting, be sure to remove the AC power cord from the AC power source.

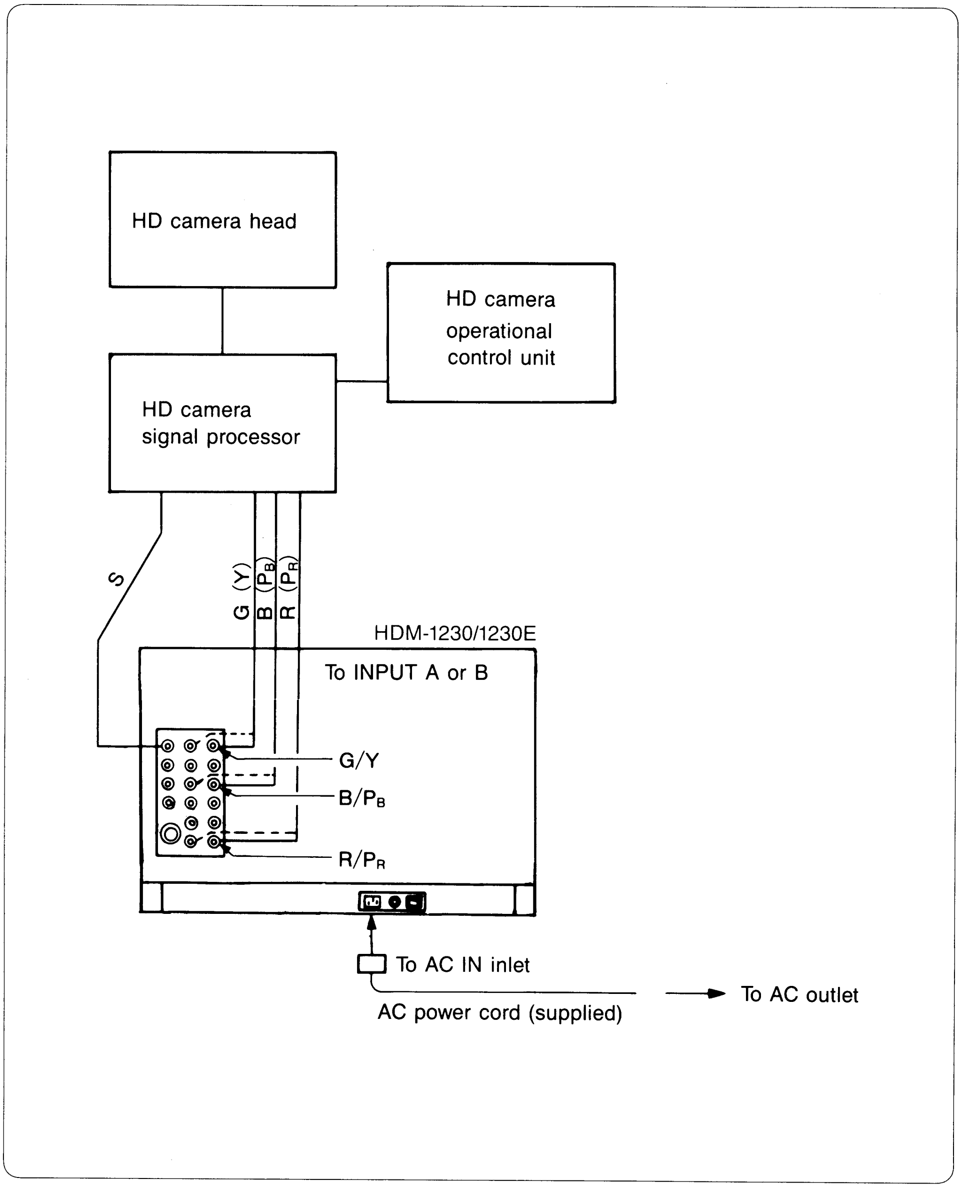


Changing the fuse

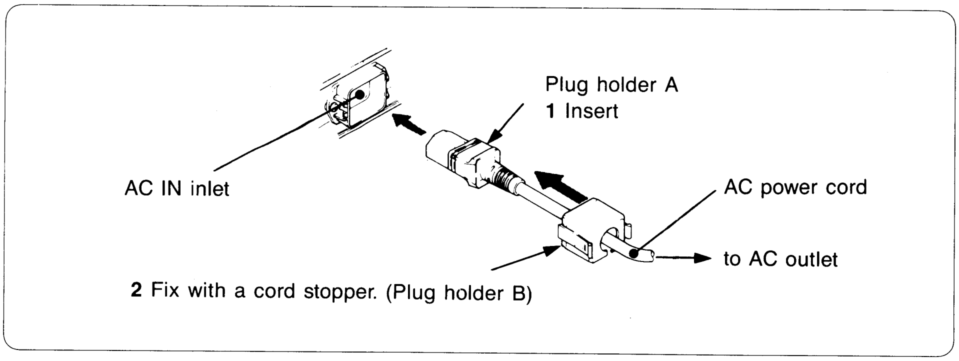
The fuse initially installed is as follows:
- 4.0A/125V fuse for 100-120V AC
- T4A/250V fuse for 220-250V AC

If you change the setting of the voltage selector, be sure to replace the fuse with the appropriate one.

1-3-2. Connection Example


HD camera head
HD camera operational control unit
HD camera signal processor
S
G (Y)
B (PB)
R (PR)
HDM-1230/1230E
To INPUT A or B
G/Y
B/PB
R/PR
To AC IN inlet
AC power cord (supplied)
To AC outlet

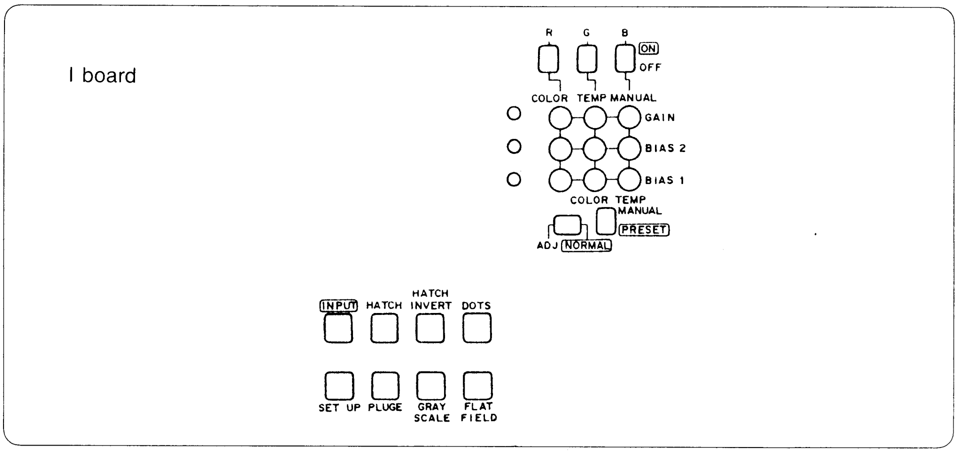
Fixing the AC power cord


Plug holder A
1 Insert
AC IN inlet
AC power cord
to AC outlet
2 Fix with a cord stopper. (Plug holder B)

1-4. Adjustment

1-4-1. Adjusting Color Temperature

Adjust the color temperature using the COLOR TEMP MANUAL switch and controls on the I board.


I board
R
G
B
ON
OFF
COLOR TEMP MANUAL
GAIN
BIAS 2
BIAS 1
COLOR TEMP
MANUAL
PRESET
ADJ
NORMAL
INPUT
HATCH
HATCH INVERT
DOTS
SET UP
PLUGE
GRAY SCALE
FLAT FIELD

- Release the CONTRAST MANUAL and BRIGHTNESS MANUAL switches (lamps go out) on the front panel. Set the screen switches (R, G, B) ON or OFF according to the color to be monitored.
- After adjustment, set the ADJ switch to NORMAL. If the switch remains at ADJ, the BRIGHTNESS MANUAL control and the beam detection circuit do not function.

1 Set the COLOR TEMP switch to MANUAL.

2 Set the ADJ switch to ADJ.

3 Press the SET UP button of the test signal buttons.

4 Adjust the black balance by the BIAS 1 controls. Recommended brightness is about 0.5 nit.

5 Press the FLAT FIELD button of the test signal buttons.

6 Adjust the white balance by the GAIN controls. Recommended brightness is about 140 nit.

7 Set the ADJ switch to NORMAL.

8 Press the SET UP button of the test signal buttons.

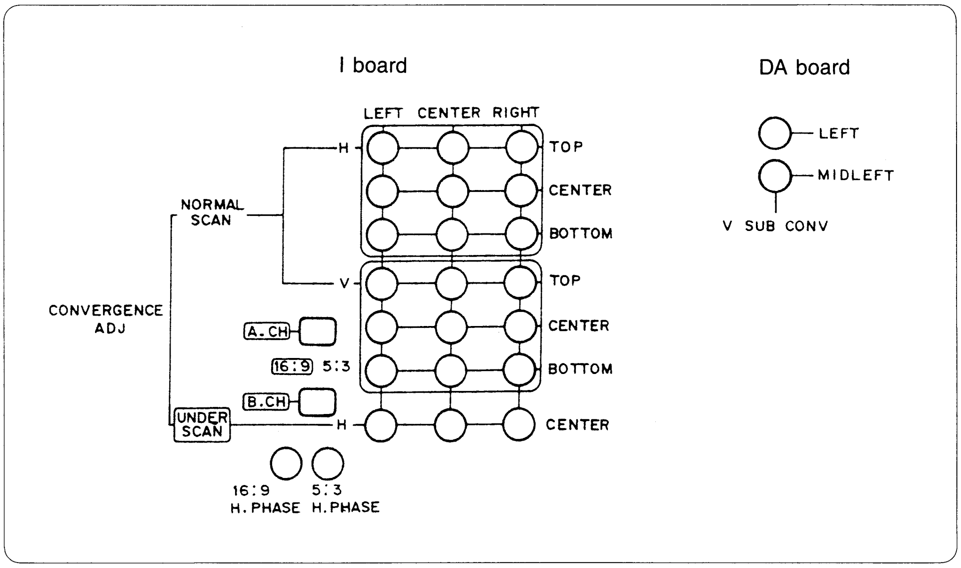
9 Precisely adjust the black balance by the BIAS 2 controls. Recommended brightness is about 0.5 nit.

10 Press the FLAT FIELD button of the test signal buttons, and check the white balance. If the white balance is not adjusted, readjust it by repeating steps 5 through 10.

Color temperature can be adjusted using the received picture. In this case, press the INPUT button of the INPUT/test signal buttons. The operations in steps 3, 5, 8 and 10 are not required.

1-4-2. Adjusting Convergence

Adjust the convergence using the CONVERGENCE ADJ block on the I board and the V SUB CONV control block on the DA board.

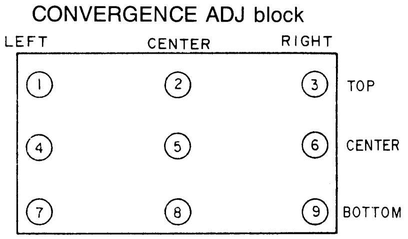

I board
DA board
LEFT CENTER RIGHT
H
V
TOP
CENTER
BOTTOM
TOP
CENTER
BOTTOM
CENTER
NORMAL SCAN
CONVERGENCE ADJ
A.CH
16:9 5:3
B.CH
UNDER SCAN
H
16:9 H.PHASE
5:3 H.PHASE
LEFT
MIDLEFT
V SUB CONV

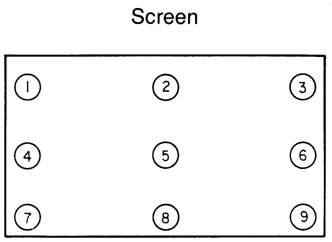
- The H controls adjust the horizontal convergence, and the V controls do the vertical one.
- Red and blue lines move symmetrically against green.

Adjusting the convergence in normal scan mode

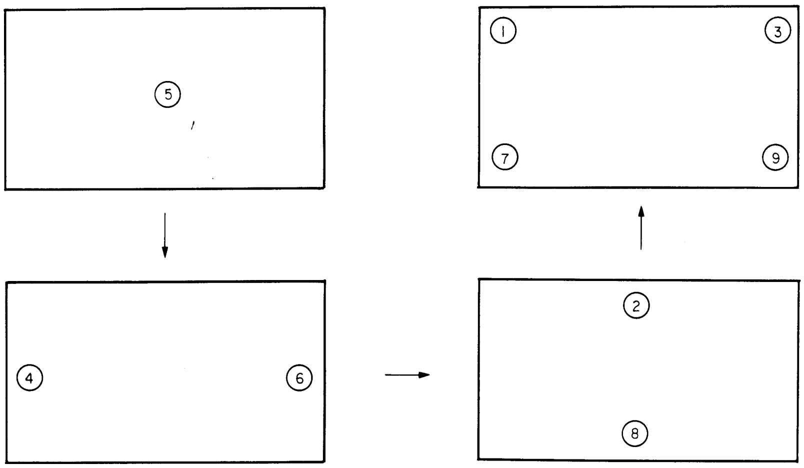
1 Release all the SCAN MODE switches on the front panel.

2 Adjust the convergence using the NORMAL SCAN H and V controls in the CONVERGENCE ADJ block. Each control corresponds to the position on the screen as follows:


CONVERGENCE ADJ block
LEFT
CENTER
RIGHT
TOP
CENTER
BOTTOM
①
②
③
④
⑤
⑥
⑦
⑧
⑨

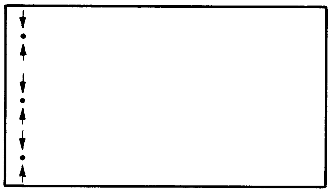

Screen
①
②
③
④
⑤
⑥
⑦
⑧
⑨

Execute the adjustment in the following order.

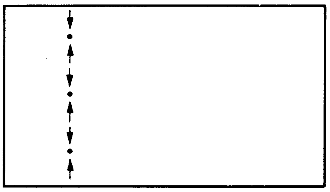


3 If the vertical convergence on the left of the screen has not been adjusted completely after adjusting it using the controls in the CONVERGENCE ADJ block, adjust it by the controls in the V SUB CONV control block. Be sure to adjust the controls because they are for fine adjustment.

i) Adjust the vertical convergence on the left of the screen using the LEFT control.



ii) Adjust the vertical convergence on the left at the center of the screen using the MID LEFT control.



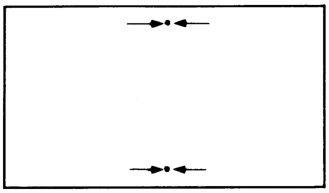
Adjusting the convergence in underscan mode

When the convergence is adjusted in normal scan mode, horizontal convergence of an underscanned picture is shifted. Adjust it as follows:

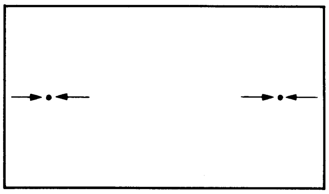
1 Depress the SCAN MODE ▣ switch on the front panel to set the unit in underscan mode.

2 Adjust the convergence with the UNDERSCAN H controls.

i) Adjust the horizontal convergence at the top and bottom of the center of the screen using the CENTER controls.

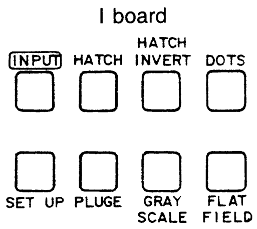


ii) Adjust the convergence at the center of both sides of the screen using the RIGHT and LEFT controls.

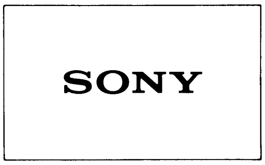


1-4-3. Checking the Unit with the Internal Test Signals

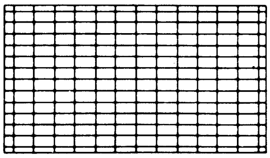
The status of this unit can be checked by monitoring the seven kinds of test signals generated by the built-in signal generator. Test signals are selected by the INPUT/test signal buttons on the I board.


I board
INPUT
HATCH
HATCH INVERT
DOTS
SET UP
PLUGE
GRAY SCALE
FLAT FIELD

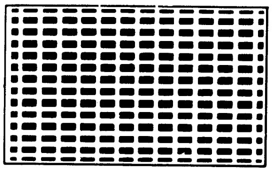
INPUT (Input signal)



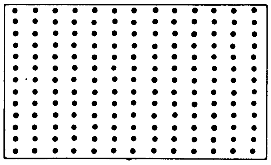
HATCH



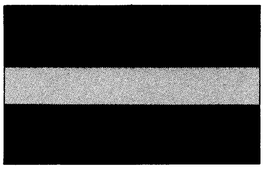
HATCH INV.



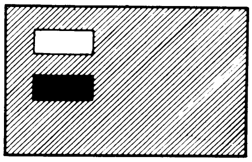
DOTS



SET UP (0% black)

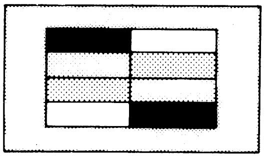


PLUGE*



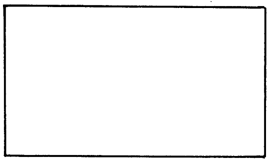
□ 2% ▨ 0%
■ −2%

GRAY SCALE



□ 50% ■ 0% □ 33%
▒ 67% □ 100%

FLAT FIELD (100% white)



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* PLUGE= Picture Line Up Generating Equipment

1-5. Specifications

System	1125 lines, 60 fields/sec., interlaced 1 HDTV studio standard (BTA S-001/SMPTE 240M standard) 2 Preceding HDTV standard (only the RGB input)
CRT	Super Fine Pitch Trinitron 0.26 mm phosphor trio pitch, 90° deflection, 36.5 ϕ in-line gun Effective picture size: 150.8 × 268 mm (h/w) (60 × $10\frac{5}{8}$ inches) 307.5 mm ($12\frac{1}{8}$ inches) measured diagonally

Input connectors and signals

Connectors		
	G/Y, B/P_B, R/P_R	BNC (2), 75 ohms or high impedance (with loop-through output)
	EXT SYNC	BNC (1), 75 ohms or high impedance (with loop-through output)
	HD, VD	BNC (1), 75 ohms
	Remote control	10-pin
Video signals		
	HDTV	GBR: Composite, 1.0 Vp-p or non-composite, 0.7 Vp-p Sync signal is ±0.3 Vp-p ±6 dB tri-level bipolar sync or 0.3V ±6 dB sync, negative. YP_BP_R: Composite, 1.0 Vp-p or non-composite, 0.7 Vp-p P_B and P_R is ±0.35 Vp-p, and the sync signal is ±0.3V ±6 dB tri-level bipolar sync.
Sync signal		
	EXT SYNC	±0.3V±6 dB tri-level bipolar sync or 0.3V±6 dB sync, negative
	HD, VD	4 Vp-p±6 dB sync, negative

Video signal

Frequency response	60 Hz to 30 MHz ±3 dB (from video input to RGB final stage when the APERTURE is OFF)
Waveform distortion	Overshoot: Less than 10% (at RGB final stage when a square wave (rise time: 0.01 μsec.) is input) Sag: Less than 2%
Linearity	DG: Less than 5% (from video input to RGB final stage)
DC restoration	Clamp voltage regulation: Less than 1% of input video signal, 10% to 90% APL
Noise	Less than −55 dB (p-p/p-p) (RGB final stage, with video input terminated with 75-ohm)
Matrix error (YPBPR)	Within 3%

Deflection and high voltage

Minimum sync level	Internal sync: −10 dB External sync: −10 dB
Deflection distortion	Within a central area bounded by a circle whose diameter equals the picture height, within 1% of the picture height (only in the normal scan mode of the HDTV system)
Picture size	Normal scan: 5% overscan Underscan: 3% underscan
Interlace	Within 55:45
Retrace time	Horizontal: Less than 3.77 μsec. Vertical: Less than 650 μsec.
Anode voltage	25±0.2 kV
EHT load regulation	Less than 1%
Convergence	Center: Less than 0.3 mm Corners: Less than 0.5 mm
Luminance	40 Ft-L (When 100% white is input at the preset level)

Color temperature (factory-setting)

Mode	Color temperature
PRESET	6500K+8MPCD
MANUAL	6500K+8MPCD

Nominal chromaticity coordinates

	X	Y
R	0.630	0.340
G	0.310	0.595
B	0.155	0.070

Resolution	Center Horizontal: More than 600 TV lines Vertical: More than 750 TV lines Corners Horizontal: More than 580 TV lines Vertical: More than 700 TV lines

Environment

Operating temperature	0°C to 40°C (32°F to 104°F)
Optimum temperature range	20°C to 30°C (68°F to 86°F)
Operating humidity	10% to 85%
Storage temperature	−20°C to +60°C (−4°F to 140°F)
Altitude	Lower than approx. 3,050 m (10,000 feet)

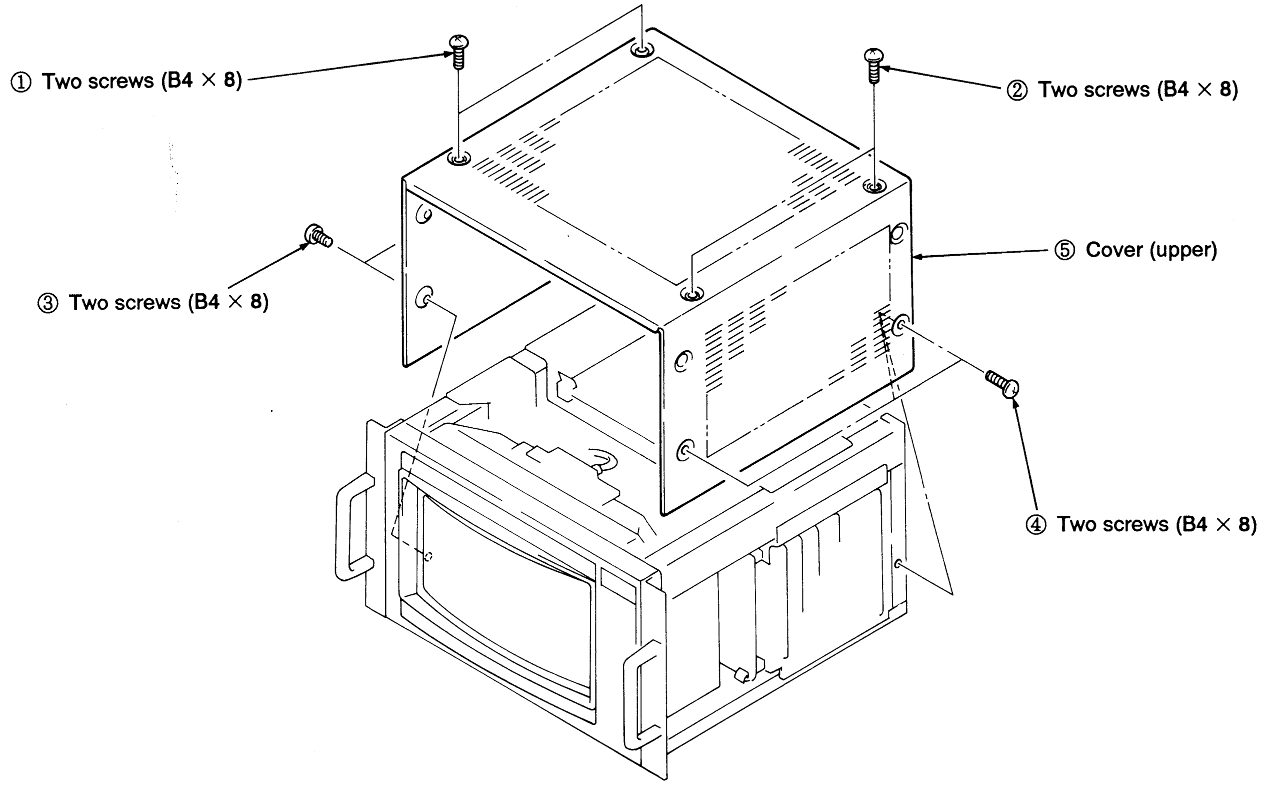
Others

Warm up time	More than 30 minutes
Power requirements	90 to 132V or 198 to 264V AC selectable, 50/60 Hz
Power consumption	180W max. (Approx. 260VA)
Weight	26 kg (57 lb 5 oz)
Dimensions	480 × 284 × 512 mm (w/h/d) (19 × $11\frac{1}{4}$ × $20\frac{1}{4}$ inches)
Supplied accessories	Fuses (2) (4A/125V or T4A/250V) Remote connector (1) Tally number plate (1) Drawer key (1) AC power cord (1) 75-ohm termination plugs (4) Operation and maintenance manual (1) Screwdriver (1) Plug holder B (1)
Optional accessory	SLR-102 slide rail

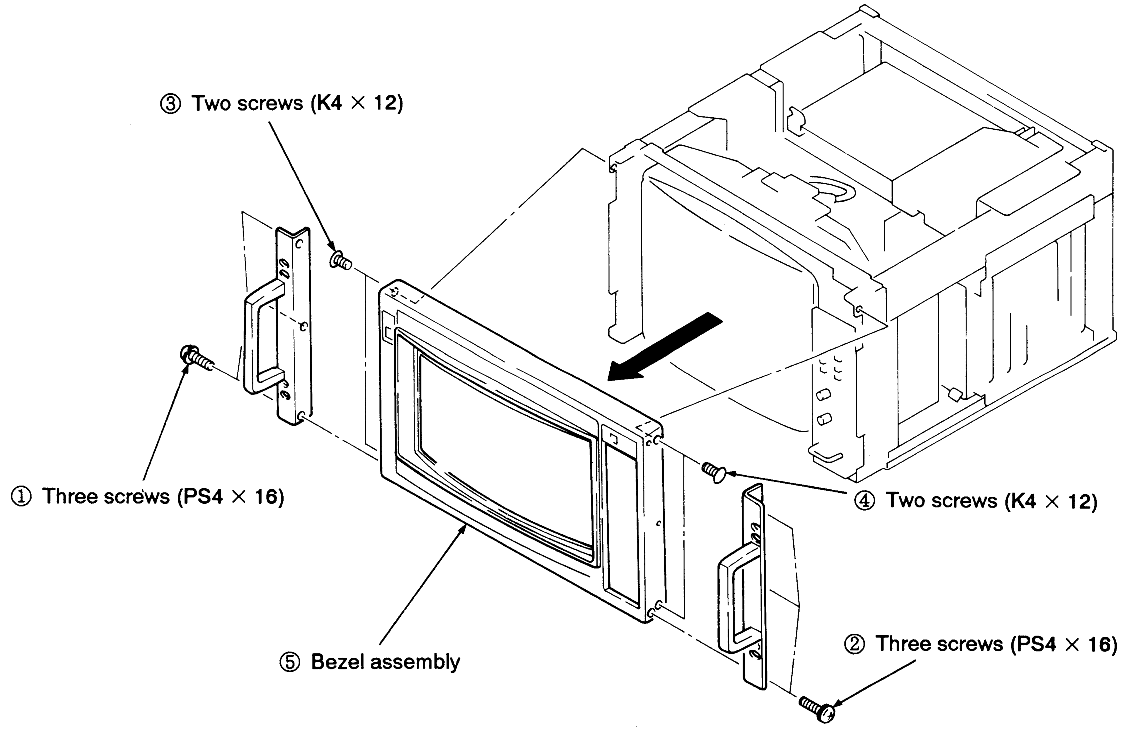
Design and specifications are subject to change without notice.

SECTION 2
DISASSEMBLY

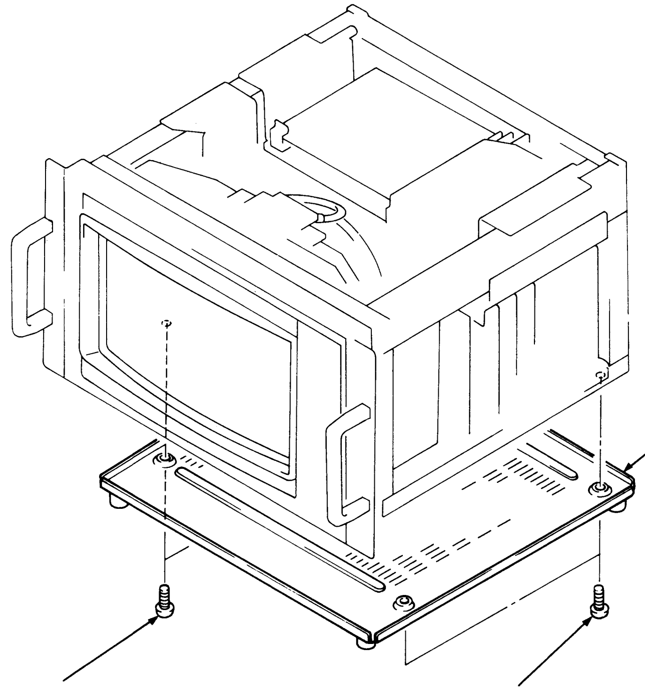
2-1. REMOVING THE COVER (UPPER)


① Two screws (B4 × 8)
② Two screws (B4 × 8)
③ Two screws (B4 × 8)
⑤ Cover (upper)
④ Two screws (B4 × 8)

2-2. REMOVING THE BEZEL ASSEMBLY


③ Two screws (K4 × 12)
① Three screws (PS4 × 16)
④ Two screws (K4 × 12)
② Three screws (PS4 × 16)
⑤ Bezel assembly

2-3. REMOVING THE COVER (LOWER)



③ Cover (lower)

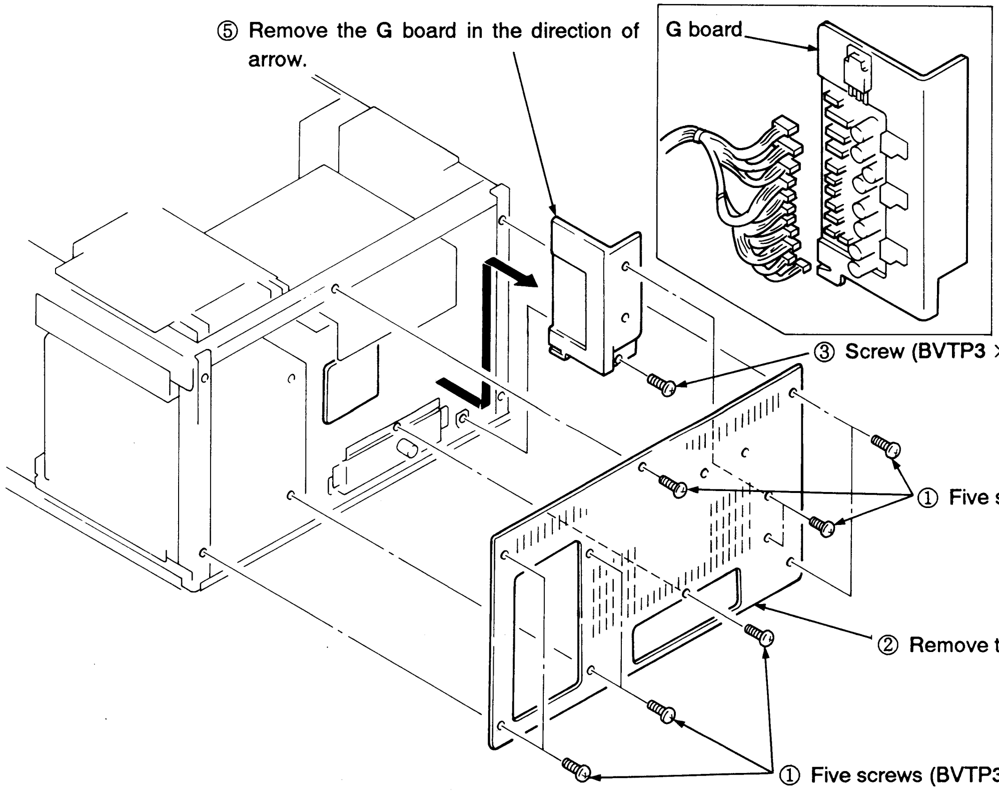
① Two screws (B4 × 8)

② Two screws (B4 × 8)

2-4. REMOVING THE BACK COVER AND G BOARD

④ Remove eleven connectors (G-1 to G-11) from the G board.

⑤ Remove the G board in the direction of arrow.



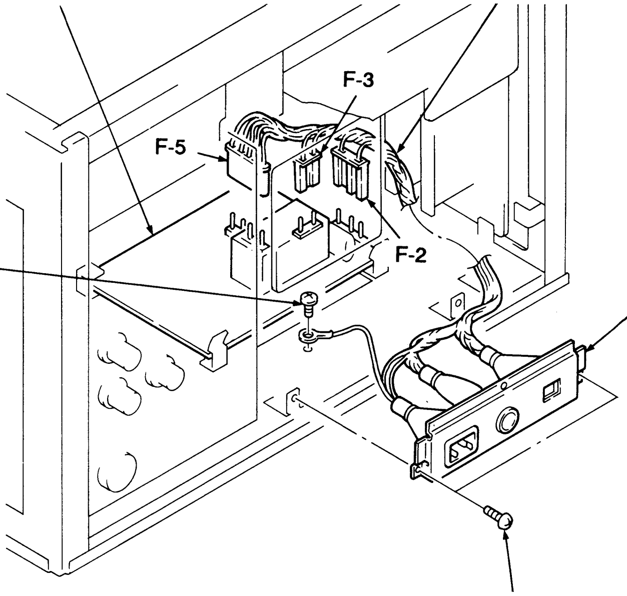
③ Screw (BVTP3 × 8)

① Five screws (BVTP3 × 8)

② Remove the back cover.

① Five screws (BVTP3 × 8)

2-5. REMOVING THE F BLOCK ASSEMBLY



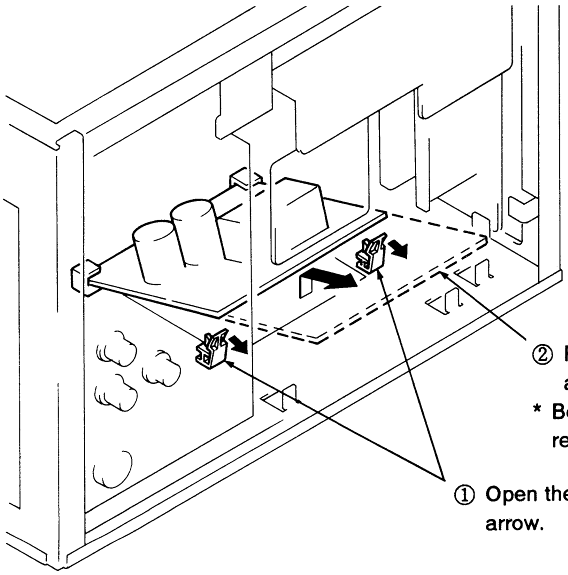
③ Remove three connectors (F-5, F-3, F-2) from the F board.
* Be careful of the CB board when removing.

② Screw (P4 × 8)

④ Remove F block assembly.

① Two screws (BVTP3 × 8)

2-6. REMOVING THE F BOARD (1)



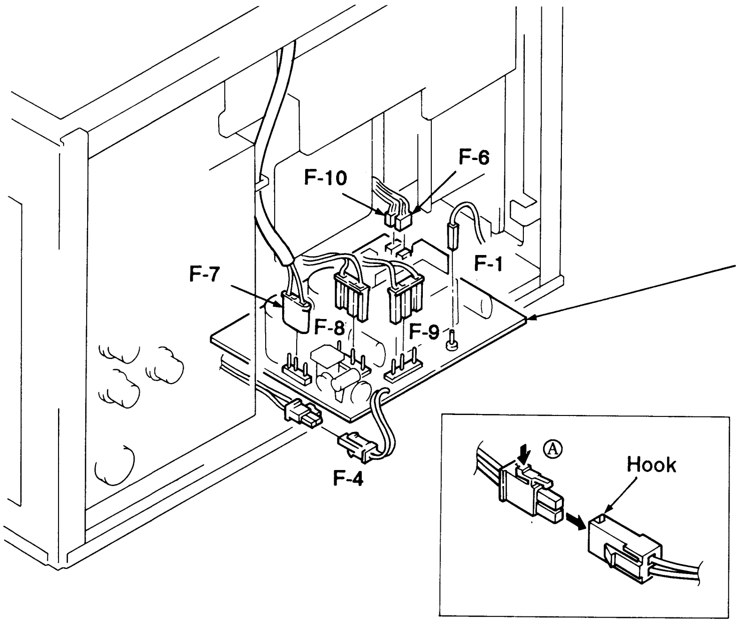
② Pull out the F bard in the direction of arrow.
* Be careful of the CB board when removing.

① Open the board holder in the direction of arrow.

2-7. REMOVING THE F BOARD (2)

① Remove seven connectors (F-1, F-4, F-6, F-7, F-8, F-9, F-10) from the F board.

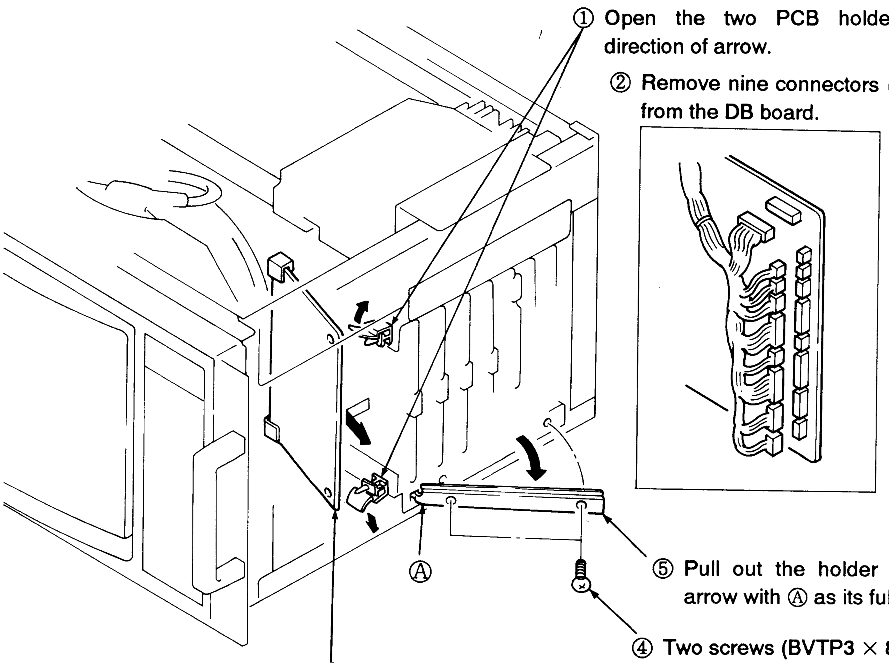
* Be careful of the CB board when removing.



② Pull out the F board.

When removing the connector (F-4), push Ⓐ portion and pull out the hook.

2-8. REMOVING THE DB BOARD AND HOLDER



① Open the two PCB holders in the direction of arrow.

② Remove nine connectors (DB-1 to DB-9) from the DB board.

⑤ Pull out the holder in the direction of arrow with Ⓐ as its fulcrum.

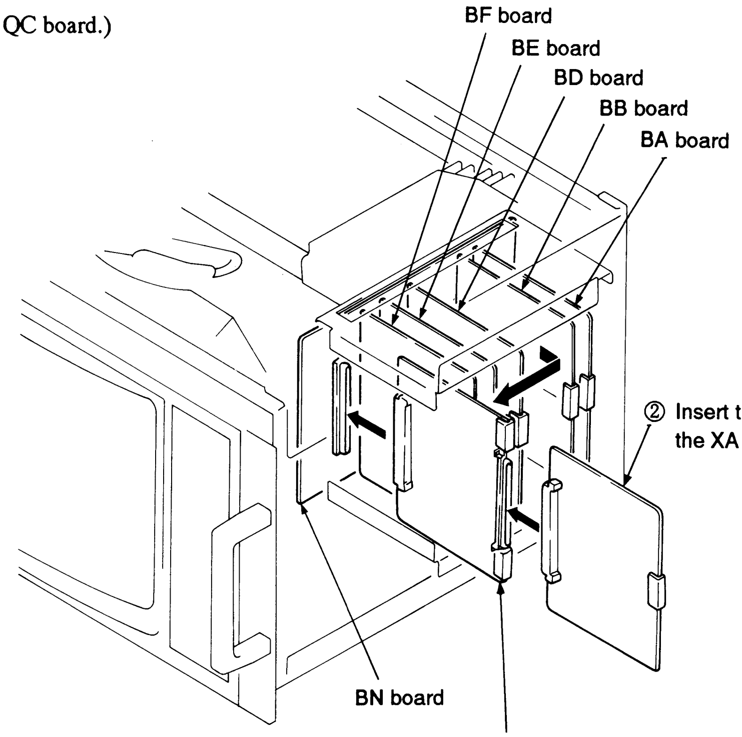
④ Two screws (BVTP3 × 8)

③ Remove the DB board in the direction of arrow.

2-9. CHECKING THE BG BOARD

Note: BA, BB, BD, BE and BF boards are also checked in the same way.

Note: When inspecting the BA board, remove the QA, QB and QC boards in advance.
(See 2-16. Removal of QC board.)



② Insert the BG board into the connector of the XA board.

① Insert the XA board into the multi-connector of the BN board.

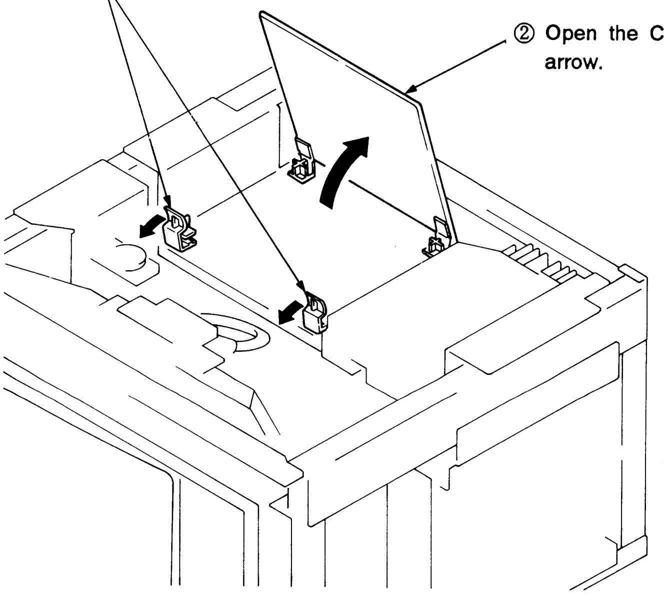
* Remove the holder before removing BG board. (Refer to 2-8.)

2-10. CHECKING THE CA BOARD

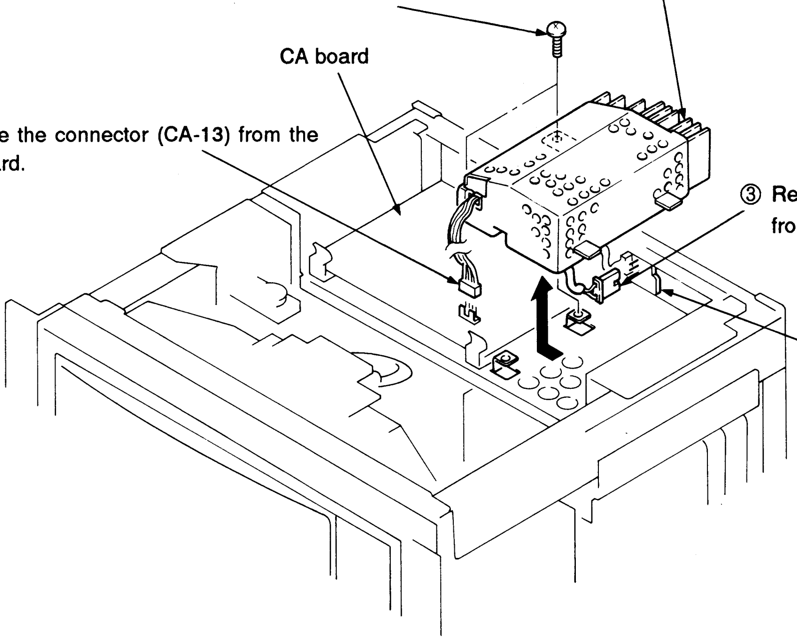
Back cover should be removed.

① Open the board holder in the direction of arrow.

② Open the CA board in the direction of arrow.



2-11. REMOVING THE SWITCHING REGULATOR



① Two screws (BVTP4 × 8)

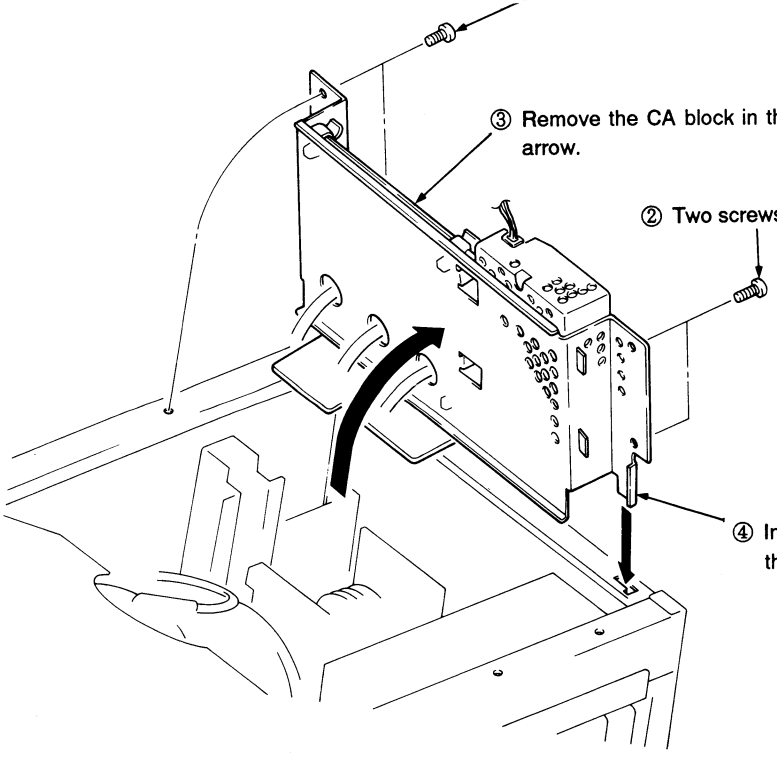
② Remove the connector (CA-13) from the CA board.

③ Remove the connector (FA-1) from the FA board.

④ Remove the switching regulator in the direction of arrow.

2-12. REMOVING THE CA BLOCK

Back cover should be removed.



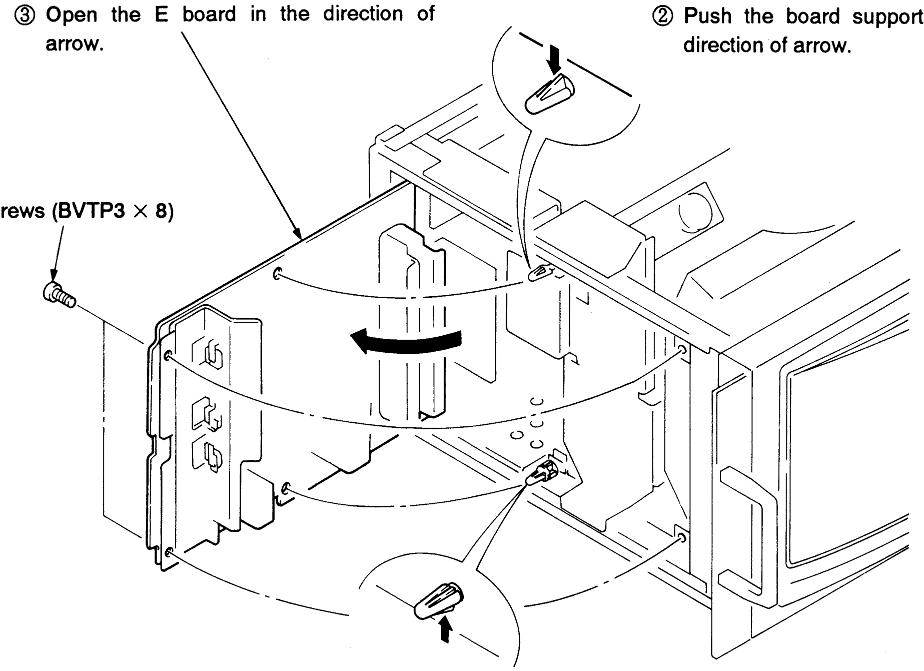
① Two screws (BVTP3 × 8)

② Two screws (BVTP3 × 8)

③ Remove the CA block in the direction of arrow.

④ Insert the CA block into the chassis.

2-13. CHECKING THE E BOARD



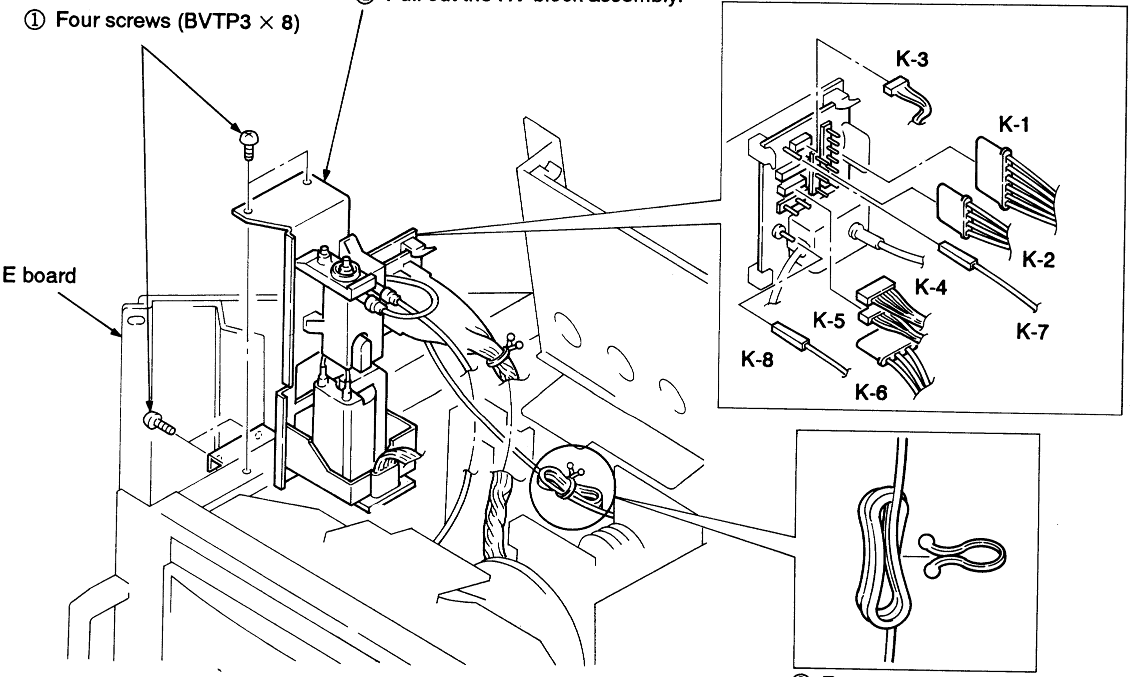
① Two screws (BVTP3 × 8)

② Push the board supporter locks in the direction of arrow.

③ Open the E board in the direction of arrow.

2-14. REMOVING THE HV BLOCK ASSEMBLY

* The E board should be opened.



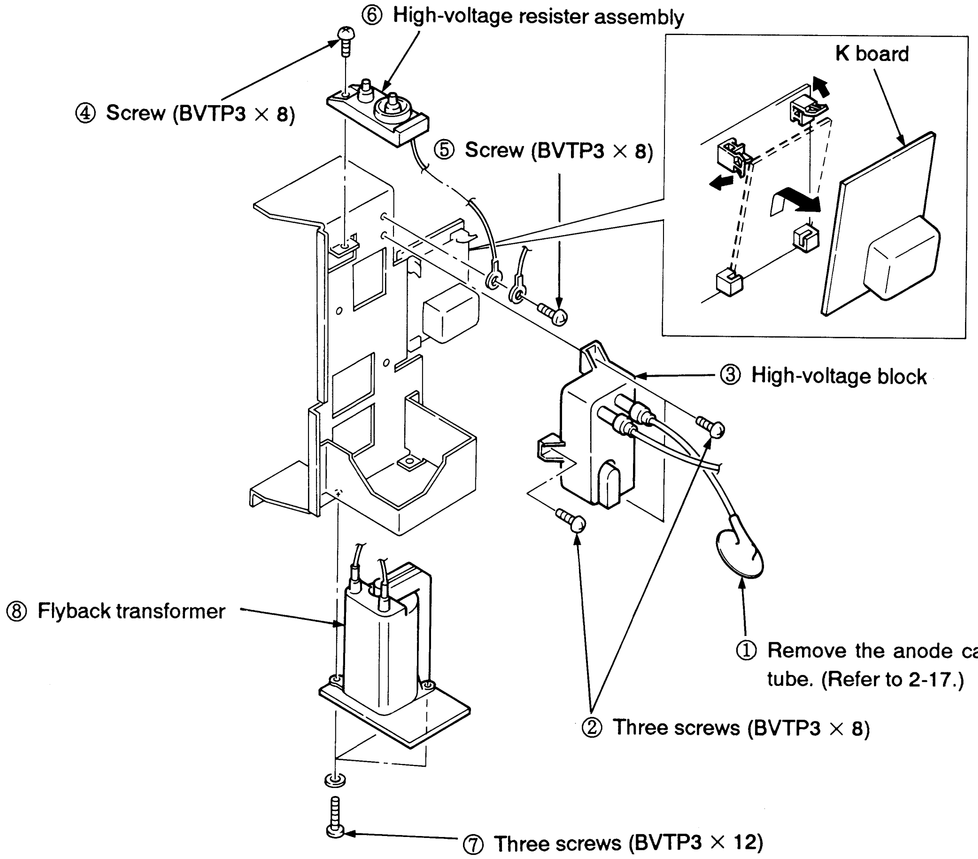
① Four screws (BVTP3 × 8)

② Remove the purse lock.

③ Remove the eight connectors (K-1 to K-8) from the K board.

④ Pull out the HV block assembly.

2-15. REMOVING THE FLYBACK TRANSFORMER, HV BLOCK AND K BOARD


⑥ High-voltage resister assembly
④ Screw (BVTP3 × 8)
⑤ Screw (BVTP3 × 8)
K board
③ High-voltage block
⑧ Flyback transformer
② Three screws (BVTP3 × 8)
⑦ Three screws (BVTP3 × 12)

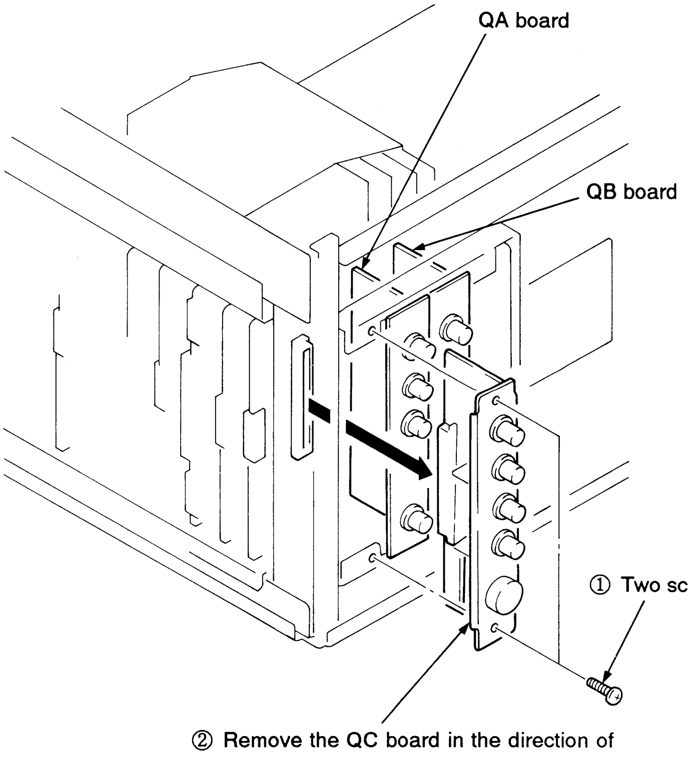
⑨ Open the two PCB holders in the direction of arrow.

⑩ Remove the K board in the direction of arrow.

① Remove the anode cap from the picture tube. (Refer to 2-17.)

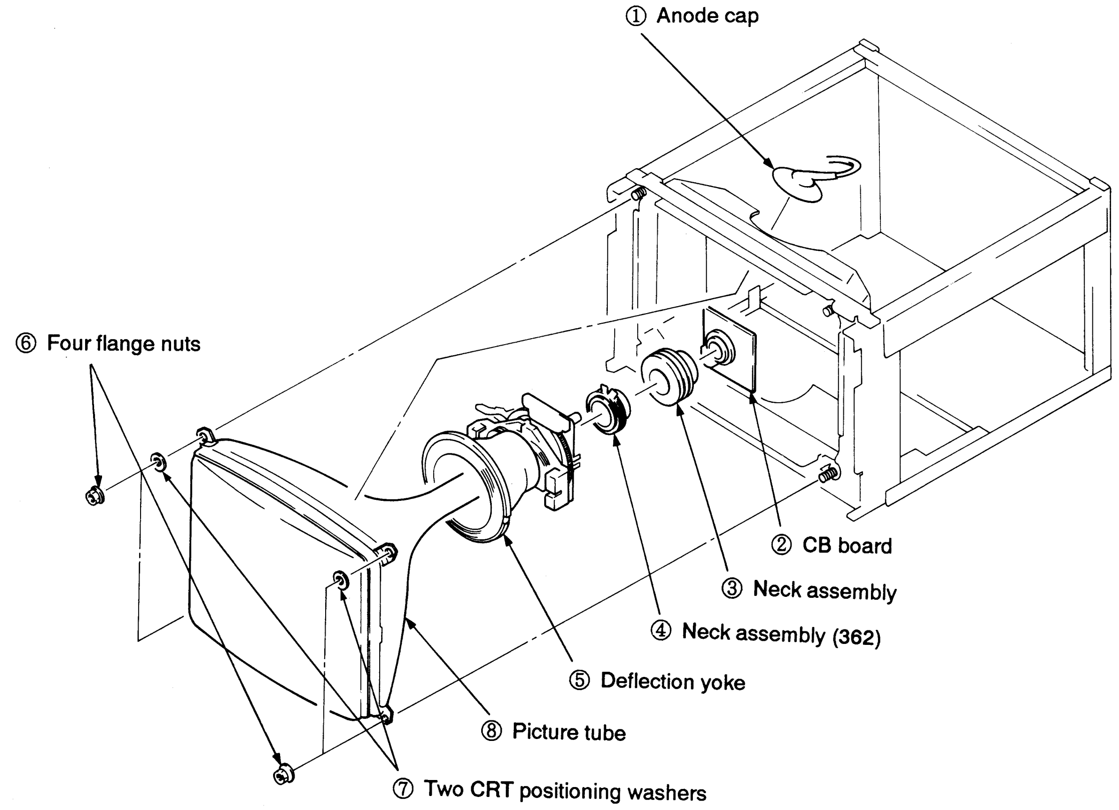
2-16. REMOVING THE QC BOARD

Note: The QA and QB boards can be removed in the same way.

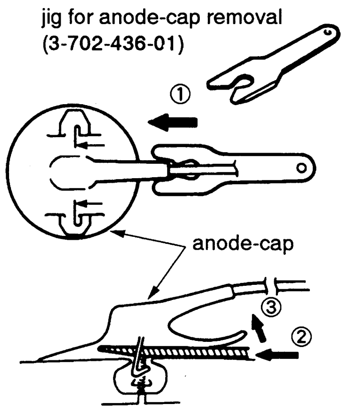

QA board
QB board
① Two screws (BVTP3 × 8)

② Remove the QC board in the direction of arrow.

2-17. REMOVING THE PICTURE TUBE


① Anode cap
⑥ Four flange nuts
② CB board
③ Neck assembly
④ Neck assembly (362)
⑤ Deflection yoke
⑧ Picture tube
⑦ Two CRT positioning washers

• REMOVAL OF ANODE-CAP


jig for anode-cap removal
(3-702-436-01)
①
anode-cap
③
②

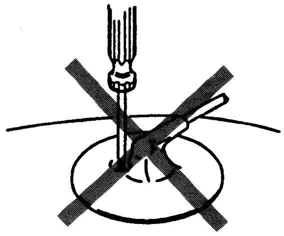
Note:
Be sure to short-circuit the anode of picture tube and anode-cap to ground before removing the anode-cap.

• HOW TO HANDLE AN ANODE-CAP

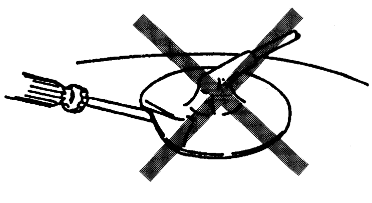
① Don't hurt the surface of anode-caps with sharp shaped material !

② Don't press the rubber hardly not to hurt inside of anode-caps !
A metal fitting called as shatter-hook terminal is built in the rubber.

③ Don't turn the foot of rubber over hardly !
The shatter-hook terminal will stick out or hurt the rubber.



Don't hurt inside !



Don't hurt outside !

SECTION 3

CIRCUIT DESCRIPTIONS

VERTICAL DRIVE WAVEFORM GENERATOR (D_A BOARD)

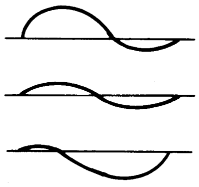
The operational amplifier IC5 (1/2) generates a sawtooth wave. It constitutes a Miller integrator circuit with C15 and R39 for producing a sawtooth waveform with good linearity. R39 is connected to a voltage determined with R37 and RV8. Q5 is a switch that resets this integrator during retrace by VD. The sawtooth voltage of ±6V appears at pin① of IC5. IC5 (2/2) inverts this and IC6 (2/2) with an analogous Miller integrator circuit converts it to a parabola wave at the output pin⑦ which becomes a sine wave after passing through the integrator of IC6 (1/2).

IC7 (1/2) combines these sawtooth wave and sine wave into a vertical drive waveform. The vertical linearity compensation is changed by increasing or decreasing the sine wave gain at RV10.

A mixture of the sawtooth wave and parabola wave enters pin② of IC6 from RV9. Since the balance of the sawtooth waveform is changed by RV9, pin① of IC6 has the voltage as shown in the figure and the balance between the picture top and bottom can be changed for the linearity compensation.

The vertical drive waveform is amplitude-adjusted by RV12 and RV13 and output through the buffer amplifier IC7 (2/2). Q13 is a picture size switch to be used at setup time.

IC4 (1/3) is an analog switch for NORMAL/SCAN and UNDER/SCAN.

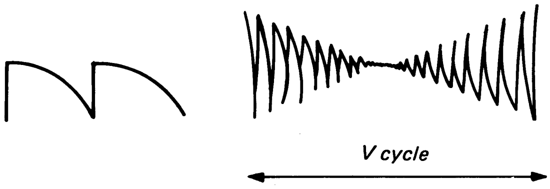


Vertical Pincushion Compensation (D_A Board)

The vertical drive voltage obtained at pin⑦ of IC7 is amplitude-adjusted by RV15 and produced at pin ① of IC10. It then is applied to pin① of IC11. The voltage is then applied to the two integrators of IC9 (1/2) and IC9 (2/2) to produce a parabola wave with a horizontal cycle as shown in the figure. This enters pin⑩ of IC11. Q11 and Q12 are reset switches. The switching timing is generated by IC8.

IC16 is a balanced modulator IC where the input wave at pin⑩ is balanced-modulated with the input wave at pin ①and a vertical pincushion compensated waveform is output at the output pin⑫ as shown in the figure. This output passes through the emitter-follower Q14 for output.

As regards the phase of a horizontal parabola, a sawtooth waveform is generated by Q9, R76, and C21 based on the reference pulse from D_B determined by IC8. It is input to pin③ of the comparator IC8. A dc voltage is fed from RV14 to pin② of the comparator which changes the phase of the pulse obtained at pin⑦ of IC13. This is passed through Q10 and converted to a reset pulse for Q11 and Q12.



Horizontal Pincushion Compensation Waveform (D_A Board)

A composite waveform of a sawtooth wave from pin⑦ of IC5, a sine wave from pin① of IC6, and a dc voltage from RV3 is obtained at pin① of IC2 (1/2). By passing this through the integrator of IC2 (2/2), a horizontal pincushion compensation waveform is obtained at pin⑦ of IC2. This waveform is gain-controlled by RV4 and RV5 and passed through the buffer amplifier IC3 for output. IC4 is used to switch NORMAL/UNDER.

The horizontal picture size control voltage is output through IC3 from RV6 and RV7.

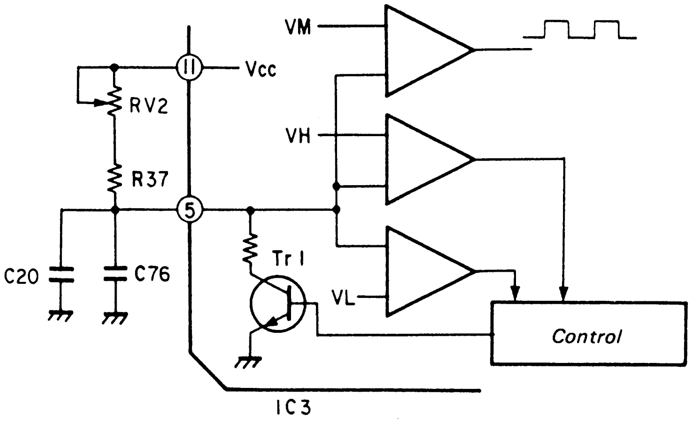
Blanking Waveform Generator (D_A, D_B Boards)

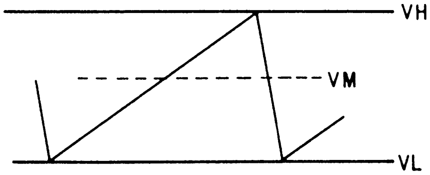
A pulse from the horizontal deflection circuit enters Q1. This pulse enters into the double integrator circuit of L2 and C66 and is converted to a parabola wave. RV1 changes the parabola wave phase. This waveform enters pin③ of the comparator IC17 through C4. Moreover, a pulse corresponding to the voltage at pin② is obtained at pin⑦ of IC17. This is output to the D_B board as a horizontal blanking signal. It is ANDed with the vertical blanking signal at Q8 and Q9 on the D_B board and the result is output as a composite blanking signal.

HORIZONTAL OSCILLATOR (D_B BOARD)

When power is applied, C20 and C76 are charged through RV2 and R3, which increases the potential at pin⑤. Pin⑤ is connected to the comparator inside IC6. If the voltage at pin⑤ becomes higher than V_H, Tr1 turns on and if lower than V_H, Tr1 turns off.

Therefore, the smaller the time constant connected to pin ⑤, the higher the frequency; and the larger the time constant, the lower the frequency.
This waveform is amplified inside the IC and appears as a horizontal drive pulse at pin ⑩ and output through the emitter-follower Q7.

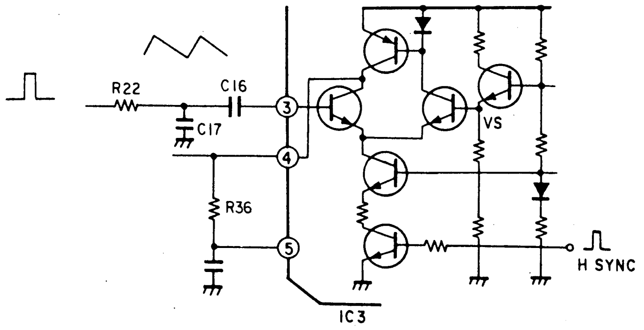




Waveform at pin ⑤

AFC Circuit (I, D_B Boards)

AFC gates the sawtooth voltage (generated by integrating the pulse from the horizontal deflection circuit by R22 and C17) based on the horizontal synchronization, smoothes, and obtains as a voltage the phase difference between the input signal and deflection circuit. This is fed back to pin ⑤ through R36. It serves to compensate the frequency error. The picture phase can be varied by changing the phase of the pulse from the horizontal deflection circuit (by IC2).

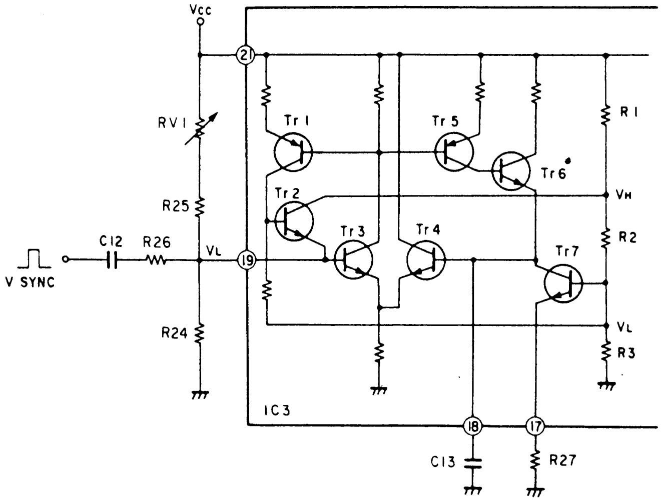


Picture Phase Adjustment (D_B, I Boards)

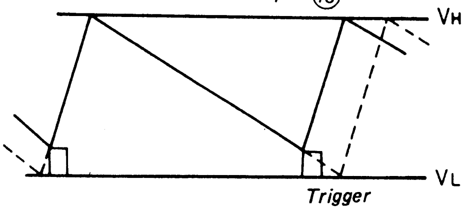
Pin ② of the picture phase control IC2 described above is connected to RV1 and RV2 of the I board and can be adjusted with these controls. IC4 (2/2) of the I board is a selector switch for the 16:9 and 5:3 mode.

VERTICAL OSCILLATOR (D_B BOARD)

The vertical oscillator operates basically the same as the horizontal oscillator except that it simply has a trigger circuit using a vertical synchronizing signal since it does not require an AFC circuit such as is found in the horizontal oscillator.
C13 and R27 provide a time constant for oscillation. Without a synchronizing signal, the base of Tr3 has a voltage VL' determined by RV1, R24, and R25. When power is applied, Tr3 turns on since the base of Tr4 is GND, and the base of Tr3 becomes V_H by Tr1 and Tr2. Furthermore, Tr5 and Tr6 turn on, which rapidly charges C13. When the base of Tr4 becomes higher than the base of Tr4, then Tr3, Tr1, Tr2, Tr5, and Tr6 turn off and C13 is discharged through Tr7 and R27. When the base of Tr4 becomes VL', Tr3 turns on and the previous condition is repeated.
If a synchronizing signal is input while C13 is discharged as shown in the figure, Tr3 turns on and C13 is charged again, which permits synchronization to be taken.
This output is amplified inside the IC and produced as a positive pulse at pin ㉒. The width of this pulse is determined by a time constant provided by R30 and C14 connected to pin ⑬.



Waveform at pin ⑱



CONVERGENCE CIRCUIT (I, D_B BOARDS)

DESCRIPTION OF CONVERGENCE CORRECTION SYSTEM

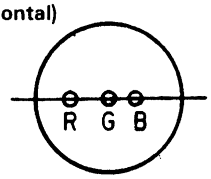
Prior to the circuit description, the convergence correction method is first described as follows.

BEAM ALIGNMET ADJUSTMENT

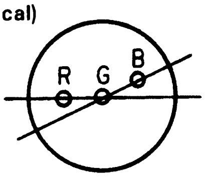
The TRINITRON employs the in-line type guns. There is possibility that the RGB beams will not go through the deflection center because of the non-uniformity in gun assembling process, or the tolerance when guns are sealed into neck. As the result, the side beams become nonsymmetrical with regard to the center beam, so that the convergence becomes difficult.

To cope with this problem, this equipment uses six pole magnet to be used for beam alignment correction. The actual alignment procedure is provided in the Alignment section.

beam nonsymmetrical (horizontal)

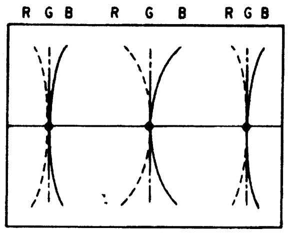


beam nonsymmetrical (vertical)

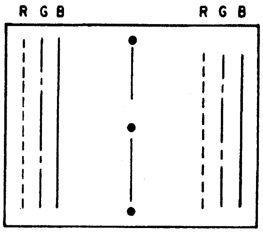


TRANSVERSAL CONVERGENCY CORRECTION

The super fine pitch TRINITRON convergence system outline is simply described as follows. The DY (deflection yoke) used in this system has an uniform magnetic field in order to avoid CRT beam spot distortion.
The CRT focus is therefore superior,but transversal convergence error as shown in Figure can happen.



Y-axis direction transversal convergence error
(When the X-axis transversal convergence error is corrected.)

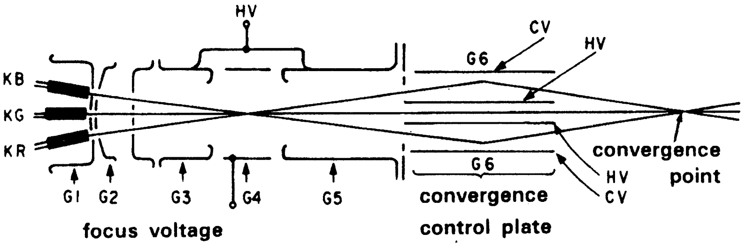


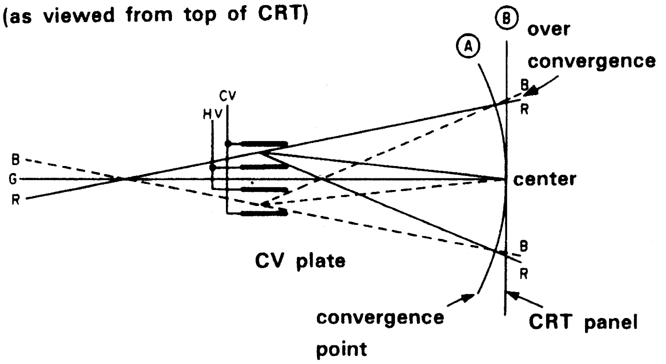
X-axis direction transversal convergence error
(When the Y-axis transversal convergence error is corrected.)

ELECTRO-STATIC CONVERGENCE

One of unique feature of the TRINITRON is the electro-static convergence that is described as follows. The Figure shows the gun structure. The G6 is the convergence control plate (CP) that is receiving the convergence voltage (CV 0.97×HV) from high tension supply (HV) through a high tension resistor (HVR). Since the center beam (green) receives no electric field strength, the center beam is not bent but runs straight.
However, the side beams (red and blue) are bent by the electric field produced by the G6 convergence control plates.

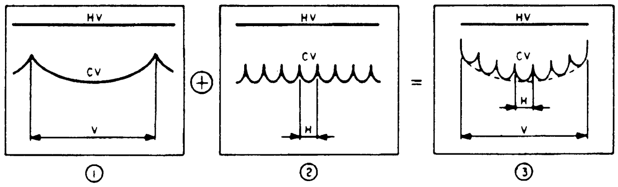
Controlling this CV voltage moves the convergence point. The electro-static system therefore is capable of convergence correction. The widely used convergence correction system employs an electro-magnetic coil, which deforms the beam shape and gives adverse effect on focus. But this electro-static system, using the CV electrode does not have such disadvanges but provides good focussing characteristics.



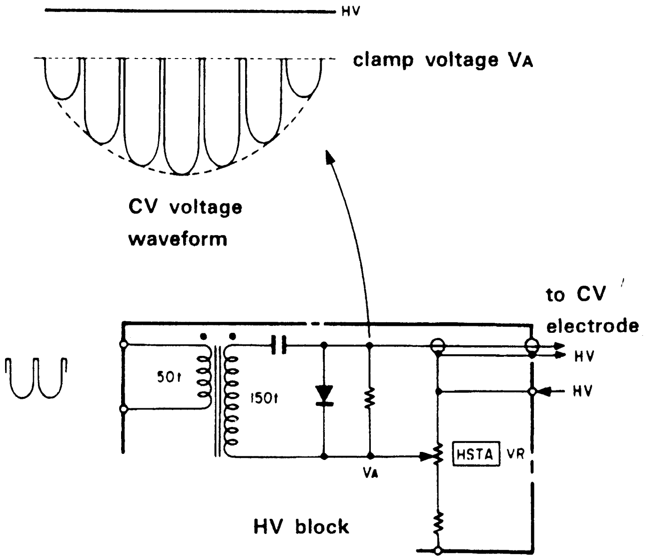


Turning back to the X-axis direction convergence error problem, the reason why the X-axis direction convergence error is generated, is described as follows. The Figure shows that the point Ⓐ is the R, G, B, convergence point when the dc convergence voltage is applied to the CV electrodes, indicating that the convergence points become cylindrical shape. However, the CRT front panel Ⓑ has nearly flat shape rather than cylindrical shape. It results that the both sides of the CRT front panel have excessive correction of convergence. This is the reason of the X-axis direction convergence error. The Y-axis direction transversal convergence error is, in the same manner as the X-axis convergence error, able to be corrected by applying the correction voltage to the CV electrodes as shown in Figure.

The above two convergence correction signals are mixed so that the mixed waveform as shown in Figure is the needed convergence correction waveform.

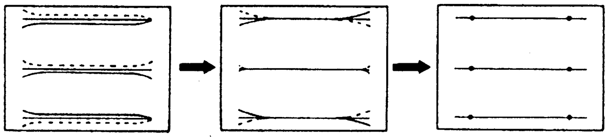


Now, since the CV electrode is receiving the very high voltage (≒ 24.3 kV), the DCT (Dynamic Convergence Transformers) is used to transmit the convergence correction waveform in order to get insulation. Since the vertical rate voltage is impossible to transmit by use of transformer, chain of pulse are inserted during the retrace period of horizontal deflection. These pulses are peak-clamped by the diode peak clamp circuit in the DCT secondary circuit so that the correction voltage is transmitted. The Y-axis direction transversal convergence error can be corrected by changing the amplitude of these pulses.



LONGITUDINAL CONVEGENCE CORRECTION

The longitudinal-direction convergence error does not exist from the princple because the gun structure is designed as in-line. However, due to the non-uniformity in assembling the CRT and DY, and also due to the earth magnetism effect, very small amount of the longitudinal convergence error is taking place.

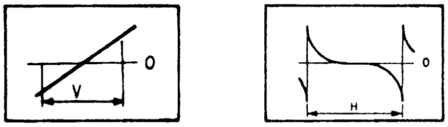


① longitudinal direction convergence error ② after corrected by NTC ③ after further corrected by CY

The longitudianl convergence error is corrected by two methods.

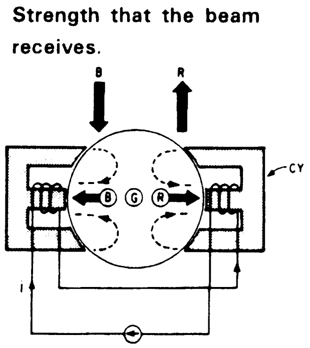
1. The longitudial convergence error along with the Y-axis (dc components) is corrected by NTC (Neck Twist Coil) as shown in Figure ② while, 2. The longitudinalconvergence error in both sides (ac components) is corrected by the CY (Convergence Yoke), as shown in Figure ③.

The correction waveforms needed to carry out the convergence error correction as shown in Figure②, ③, are the NTC and CY correction waveforms as shown in Figure ①, ②.



①NTC ②CY

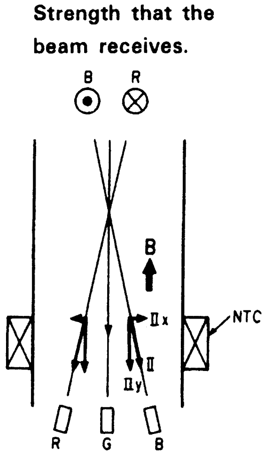
There are two CYs in HDM-1230/1230E. One of them performs the previously mentioned operation, but since a high-frequency current is sent through it (the CY is an inductance) and the blanking period is short (3.77 μS), the correction waveform is delayed, and the left side cannot be properly corrected. Therefore, a sub-CY is used for complementary correction.



(As viewed from neck end)

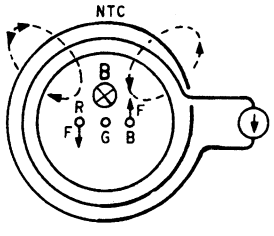
Figure shows the CY (Convergence Yoke).as viewed from the neck side. As the CY (Convergence Yoke) is generating the magnetic fluxes, it provides the physical strength toward beams as shown in Figure. The strength on the side beams area (B and R) are, as shown in Figure, generated in opposide directions each other by the CY synthesized magnetic fluxes. The one direction of strength is to raise the one beam upward direction, while the another direction is lowering the another beam downward direction.

The center beam receives no strength from the CY's magnetic fluxes because the magnetic fluxes are cancelled to zero in the center beam area. The red and blue beams moves in the vertical directions symmetrically against the green beam in the center.



(As viewed from the the top of CRT)

①



(As viewed from the CRT neck end)

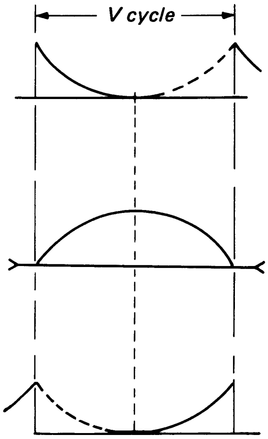
②

The longitudinal convergence correction along with the Y-axis is carried out by the NTC (Neck Twist Coil). The NTC (Neck Twist Coil) has the coil winding as shown by the dotted line in Fig. ②. The NTC produces the magnetic flux as shown B in the same Fig. ①. Since the magnetic flux B is in parallel with the center beam, the center beam receives no strength, and does not move at all. The side beams' currents I and II receive strength in two directions of the Ix direction and the Iy direction as vectoranalyzed in Fig. ②. Only the Ix component alone receives strength from the NTC magnetic flux and is bent. Therefore, the red and the blue beams are shifted upwards and downwards symmetrically against the green beam by the NTC coil's magnetic flux change. This is the description of the convergence correction system. Following is the circuit description.

Convergence Compensation Waveform (I Board)

This set allows convergence to be corrected at nine points on the screen. Namely it has three horizontal correction points and three vertical correction points. The layout of convergence adjustment volume controls corresponds to the correction points on the screen. There are nine horizontal convergence controls and nine vertical convergence controls. To divide vertically the convergence correction portions into three parts, the following parabola wave is used.

(1) Parabola wave (arriving from pin ⑦ of IC6 on D_A)
(2) Parabola wave clamped by Q1, Q2



IC1 (1/2) and IC1 (2/2) invert these parabola waves. IC4 (1/3) and (3/3) are analog switches that divide the parabola wave into the first and second halves of the vertical cycle and feed them to the convergence control VR of RV3 to RV20.

Horizontal Convergence (I, D_B Boards)

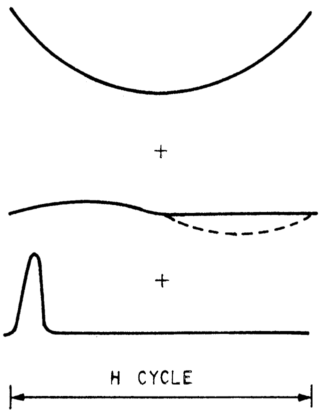
For the horizontal convergence on the left side, a composite voltage waveform from RV12 to R14 of the I board is obtained at pin ⑦ of IC3 for output to DB (HCL). (Q3 is turned on during NORMAL SCAN.)
On the D_B board, Q28 is switched by the pulse from the horizontal deflection based on this voltage. The voltage is converted to a parabola wave by the double integrator of L5 and C61, amplified by Q29, clamped at Q31 and IC6 to zero potential at the center by the pulse from Q13, and input to pin ⑤ of IC8 from Q30. Varying this voltage changes the amplitude of the parabola wave.
For convergence (HCR) on the right side, the waveform enters pin ③ of IC8 after passing through the similar circuits (Q24, Q25, Q26, Q27, and IC6 (1/2)).
IC8 is an analog switching IC where the horizontal cycle control signal from pin ① of IC4 is applied to pin ⑨. Accordingly, the compensation waveform is switched between the first and second halves of the horizontal synchronization, namely for the left and

right. The composite compensation waveform thus obtained enters Q35.
The convergence for the center (HCC) is fetched from RV15 to 17 and IC5 on the I board and output to D_B. (Q5 turns on at setup time and Q6 during underscan.) On the D_B board, the voltage enters Q34 and is pulse-converted by D6. A composite waveform with the preceding Q35 is output to Q36 as a horizontal convergence compensation waveform.

Vertical Convergence (I, D_B Boards)

As in the horizontal convergence, the waveforms fetched by RV3 to RV5 (VCL) and RV9 to RV11 (VCR on the I board are each zero-clamped by IC5 on the DB board, switched between left and right by IC8 (1/3), and output to E through the emitter followers Q37 and Q38.

Since the high frequency current flows in the inductance CY (convergence yoke) and the correction wave delays due to a short blanking period (3.77 μsec), vertical convergence correction at the left edge is not performed well. Thus, perform the correction by adding the sine and pulse waves to the H period parabola wave at the Q37 on the DB board.



The Vertical convergence for the center (VCC) is combined by RV6 to RV8 on the I board and output through the current amplifier of IC7, Q32, and Q33 for driving NTC.

Vertical Deflection Output Circuit (E Board)

The vertical deflection sawtooth wave and the vertical pincushion correction wave are input to the differential amplifier of Q9, driven by Q12, and amplified by the SEPP complementary amplifier made up of Q10, 11, 13, and 14 for driving the vertical deflection yoke. T3 (VPT) connected to the output terminal selects only the top and bottom pincushion correction wave with horizontal cycle, boosts it, and modules the deflection yoke current on the secondary winding. R45, R46, and R47 connected to T1 are used to damp T1 and the vertical deflection yoke, which stabilizes the deflection in the upper part of the screen.
R49 attached at bottom of the secondary winding of VPT detects a deflection yoke current and R48 applies NFB to improve the waveform. The thyristor D15 applies the flyback pulse for the vertical deflection yoke in the vertical retrace period to the gate from R41 and C21, turns it on, and improves the linearity of the deflection current by driving the retrace period from a high voltage. L7 on the anode side of D15 changes a sudden current change encountered when the thyristor turns on into a resonance current by L7 and C20. It serves to allow the thyristor D15 to turn off only when the current definitely falls below the holding current.

Horizontal Deflection Output Circuit (E Board)

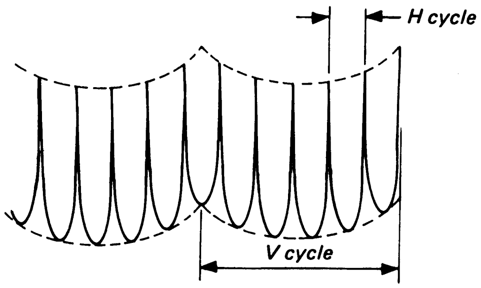
The left and right pincushion is corrected by modulating the supply voltage of the horizontal deflection circuit. This is done by a circuit made up of IC1, Q1, Q2, and Q3 where Q2 is an output transistor and IC1 an error amplifier. The left and right pincushion correction waveform from the D board and the picture size dc voltage are input to pin ⑤ of IC1. Pin ⑥ provides a voltage detected by R9 to R11.
The H drive pulse from the D board enters Q4 and drives the horizontal drive transformer T1 (HDT).
The secondary side of T2 has R17 and the speed-up diode D3 which are connected to the base of the horizontal deflection output Q5, and switches Q5.
To the collector of Q5 are connected the horizontal deflection yoke, resonance capacitors C10 and C11, and damper diodes D4 and D5. The left and right pincushion correction power is supplied from the horizontal output transformer (HOT) T2.
One of the secondary windings of HOT generates power for horizontal position adjustment using D6 and D7, and adjusts the horizontal position using Q6 and Q7. The other winding is an AFC pulse winding where the pulse is converted to a horizontal pulse using the dynamic focusing circuit and Q15, Q37, Q38, and Q39 and fed to the AFC circuit, vertical pincushion, convergence circuit, etc.
The current flowing the horizontal deflection yoke passes through the L1 horizontal linearity coil (HLC) and flows into the S shape compensation capacitor C16. Since the inductance of HLC changes with the current, the linearity distortion at the left and right of the raster is improved, and C16 compensates the linearity difference between the screen center and the two sides.

Dynamic Focusing Circuit (E Board)

The AFC pulse output voltage at T2 (HOT) is integrated by L3 and C90, and input to the primary

winding of the dynamic focusing transformer (DFT) T4 for integration. A parabola wave voltage of about 650Vp-p is obtained at the secondary winding. Q34 amplifies the vertical cycle parabola wave voltage output from pin⑦of IC10 (D board) to about 200 Vp-p. Since one of the terminals of the secondary winding of T4 is connected to the output of Q34, the voltage at the other terminal of the secondary winding of T4 provides a dynamic focus waveform which is an overlap of horizontal cycle parabola and vertical cycle parabola. This waveform enters the K board through E-6 and is connected to the focus volume control for modulating the focus voltage.
D18 and C28 rectify the AFC pulse to generate power of about -150V which is supplied to Q34.

Dynamic focus waveform



Vertical Convergence Output Circuit (E Board)

This circuit amplifies the current of the vertical convergence compensation waveform from the DB board and supplies it to CY. It consists of Q22, Q23, and Q25 to Q28.

Horizontal Convergence Output Circuit (E Board)

This circuit amplifies the voltage of the horizontal convergence compensation waveform from the DB board and applies it to the transformer (HCT). It consists of Q16 to Q21.

Horizontal Convergence Compensation

Every horizontal convergence error is corrected by the convergence plate inside CRT. Namely, a static convergence error is corrected by adjusting the voltage (CV) supplied to the convergence plate and a dynamic convergence error by modulating with the horizontal cycle and vertical cycle voltages the CV voltage via HCT in the high voltage block.
A clamping circuit is connected to the secondary side of HCT. The modulated voltage is peak-clamped and fed to the convergence plate.

EHT Regulator (E Board)

The H drive pulse at pin 1 of the terminal E-3 is converted to an EHT drive pulse by IC2. It drives the high voltage output Q31 after passing through Q29, Q30, and T5 (CDT). To the collector of Q31 are connected C47, D29, T6 (LOT), and the flyback transformer (FBT) via the K board which perform the same operation as the horizontal output circuit.
The +B voltage is supplied through T6. FBT is a multi-singular type with six rectifier diodes incorporated on the secondary side. The focusing voltage is drawn from the second stage. The high voltage output of FBT is supplied to the anode of CRT via the HV block and simultaneously divided to 1/3,000 by the high voltage resistor to be fed to pin③and pin⑤ of the terminal E7. The voltage at pin③is supplied to the error amplifier IC3 (1/2) via the buffer IC3 (2/2) as a high voltage error detecting voltage. It is compared there with the reference voltage (VRF = 8.33V) and the difference is amplified and connected to pin⑤ of IC4 for pulse width modulation (PWM).
On the other hand, pin⑦of IC2 is connected to pin 4 of IC4 which repeats the on/off operation to charge and discharge C62. In other words it is a sawtooth wave generator. IC4 (1/2) performs PWM.
The pulse generated at pin⑦of IC4 gates D57 via the buffer Q32. Consequently, the back pulse energy created at the anode is controlled, leading to control of the energy to FBT.
The EHT regulation is implemented by the above operations.
Besides the high voltage output, this EHT regulator generates outputs including a ±20V output (vertical output circuit) from FBT, and +15V (for 12V), 8V (for 5V), ±30V (for driving CY), 6.3V (for heater), and -120V (for G1 bias) from T6 (LOT).

High Voltage Hold Down Circuit (E Board)

The feedback voltage (normally 9.00V) from HV that appears at pin⑤of the terminal E-17 is supplied to the (+) input of the comparator IC5 (2/2) and compared with the (-) input voltage VHV. The value of VHV is set to 9.17 ± 0.20V by △R141. Accordingly, pin⑦of IC5 (2/2) normally is "LO".
If for some reason the high voltage rises abnormally, causing the (+) input voltage at IC5 (2/2) to exceed the VHV value, pin⑦of IC5 (2/2) goes "HI", which turns on the thyristor D45. The output of IC2 is connected to the anode of D45. Accordingly, there will be no drive pulse if D45 turns on, which holds down the high voltage.
The high voltage value at the time the hold-down operation is initiated can be calculated by the following formula:

$$\text{HV (PRT)} = 9.17\ (\pm 0.2\text{V}) \times 3{,}000$$
$$\begin{pmatrix} +1\% \\ -3\% \end{pmatrix} = 27.5 \pm 1.5\text{kV}$$

Beam Protector Circuit (E Board)

This circuit stops generation of a high voltage if for some reason the anode current of CRT increases more than necessary. It is a kind of ABL circuit. This set provides two beam protectors.

To detect the anode current, the current on the secondary side (CRT current + high voltage resistor current + focus resistor current) of FBT is taken out by detecting resistors as a voltage. These detecting resistors are R134, R135, and R136. When the ABL current flows, the voltage at pin⑦of the terminal E-17 drops. Now the breeder current flowing in the high voltage resistor and focus resistor is constant. Therefore, as the CRT current increases, the (+) input voltage at IC5 (1/2) becomes lower than the (-) input voltage (VRV) and the output pin goes "LO". Since IC5 (1/2) constitutes a hysteresis comparator, the output is held to "LO". As a result, IC5 (1/2) (high voltage converter drive) is stopped via D43. (Beam protector ①)
On the other hand, the cathode of D44 is connected to pin⑦(ABL) of the terminal E-17. If the beam protector 1 fails to operate, D44 becomes conducting and drops the input voltage at pin⑤of IC6 (2/2). If the voltage at the (+) input (pin⑤) of IC6 (2/2) becomes lower than the voltage at the (-) input (pin⑥), the output (pin⑦) goes from "HI" to "LO", which makes the diode D54 conducting. As a result, the output of IC2 is cut off, stopping the high voltage generation. (Beam protector ②)

Picture Tube Protector (E Board)

To prevent burning of the fluorescent screen of CRT which would happen if the deflection circuit fails, this circuit detects stop of a horizontal deflection output and vertical deflection output and stops the high voltage circuit.
The secondary pulse of T2 of HOT in the horizontal deflection circuit is converted to a dc voltage by D46 and C76. Pin ⑥connected to pin⑤of IC6 (2/2) has a voltage of 6.2V which is determined by D48. Therefore, if the horizontal deflection stops, pin⑥becomes lower than pin⑦, and pin⑦of the output of IC6 (2/2) goes LO, which stops the high voltage drive through D54.
Similarly, in the vertical deflection circuit, the deflection pulse is converted to a dc voltage by D50 and C80 and connected to pin③of IC6 (1/2). Therefore if the deflection stops, the voltage at pin③becomes lower than pin②and pin①of IC6 goes LO, which stops the high voltage.
C78 and R170 are used to prevent a protector operation error at SW ON time.

POWER CIRCUIT (F, G_A, G_B, G BOARDS)

Line Filter (F Board)

The line filter consists of T1 and T2, C1, C2 through C6, and C8 on the F board. The input side of this filter is connected directly to AC INLET.

AC Supply Voltage Switching

The AC input voltage is changed by switching the double voltage rectification and full-wave rectification by the voltage selector.
This makes available the input voltages of 100 to 120 VAC and 220 to 240VAC.

Degaussing

The degaussing coil is used to demagnetize CRT. It is performed by letting the ac attenuating current flow through the degaussing coil (L902) connected in series to the posistor. The degaussing is done automatically in about five seconds when power is turned on by the relay (RY-1) on the F board and Q2 on the G board. It is performed likewise by pressing the degauss button on the front.
The posistor is switched by the voltage selector.

AC Overvoltage Protection Circuit (F Board)

The protection circuit of D1 is actuated on the F board to blow the AC fuse if an overvoltage is applied erroneously to the AC input line or the power switch is turned on with a wrong selection with the voltage selector. This circuit is designed to operate when about 140% or more of the AC voltage indicated in the voltage selector is applied.

SWITCHING POWER START UP POWER SUPPLY (F BOARD)

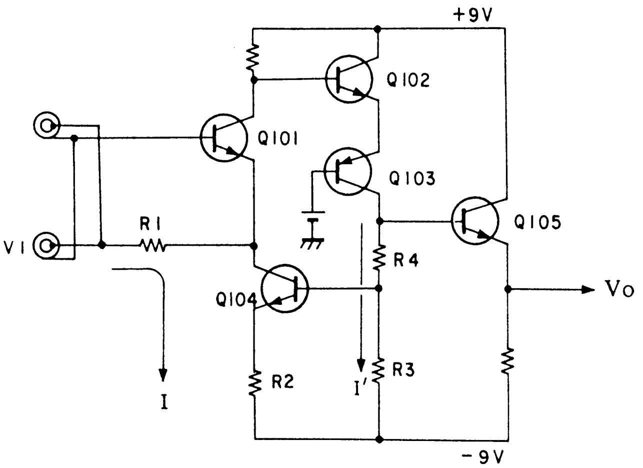
When power is turned on, the blocking power supply consisting of Q1, Q2, and T3 operates to provide about 15V of startup voltage for the switching power supply by D9 and C21 on the secondary side of T3. When the switching power supply operates, 15V is given to pin①of IC1.
Consequently, the blocking power supply is stopped by IC1 and 15V is given by D1 on the G board instead for continuous operation.

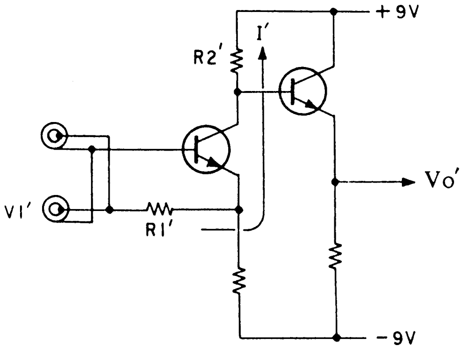
REGULATOR CIRCUIT (G BOARD)

This circuit distributes the switching power supply output of 115V and ±15V, and +15V and 8V from the E board to each board through the three-terminal regulators IC1 to IC4.

FLOATING TYPE INPUT BUFFER (Q_A, Q_B, Q_C BOARDS)

The EXT SYNC channel and HD channel on the Q_C board are explained below.
The R, G, B channels of the Q_A and Q_B boards have the same circuit as EXT SYNC, and the VD channel of the Q_C board the same as the HD channel.





From

$$Vo = (R3 + R4)\, I'$$

$$I' = \frac{R2}{R3} I$$

$$I = \frac{V_I}{R1}$$

$$Vo = (1 + \frac{R4}{R3}) \frac{R2}{R1} V_I \text{ is obtained.}$$

Letting R1 = 13k, R2 = 4.7k, R3 = 1k, R4 = 2.2k
Then V0 = V1
Consequently, the gain is 1 time.
From V0' = R2' I'

$$I' = \frac{V1'}{R1'}$$

$$V0' = \frac{R2'}{R1'} V1' \text{ is obtained.}$$

Letting R1' = 680, R2' = 1.5k
Then V0 = 2.2V1'.
Consequently, the gain is 2.2 times.

INPUT SWITCHING (B_A BOARD)

The Ach and Bch video signals R/C_W, G/Y, and B/C_N that are output from the Q_A and Q_B boards are input respectively to IC101, 102 and 103 (LA7016) for switching between Ach and Bch. The video signals via these switching IC are output from the B_A board through the video buffers Q101, 102, and 103 and enter the B_B board. Meanwhile EXT SYNC from the Q_C board enters one of the inputs of the video switch IC202. To the other input is connected the G/Y signal from Q102. SYNC INT/EXT is switched here and the output passes through the buffer Q203 and enters the B_F board (sync process).
HD and VD from the Q_C board are clamped by D201 and D203, and output through the buffers Q201 and 202 for input to the B_F board.

Local/Remote Switching

The four control signals, namely COLOR/B&W, Sync Int/Ext, Input A/B, Tally Lamp ON/OFF are switched between local control and remote control. In the local control line, the control signal is sent from SW on the front panel and input to the 3-state buffer IC204 with "low" disabled. In the remote control line, the control signal is sent from the remote terminal on the input terminal strip and input to the 3-state buffer IC203 with "high" disabled. The outputs of these two 3-state buffers are connected in parallel as respective control signals.

Q_A, Q_B, Q_C Power Circuits

The power supplies for Q_A, Q_B, and Q_C comprise IC305, Q301, 302; IC306, Q303, 304; and IC307, Q306, 307 respectively. Each of these is a ±9V tracking power supply. The output voltage can be turned off by dropping pin ⑧ of IC to the GND level. This allows the Bch power to be off when Ach is selected, the Ach power to be off when Bch is selected, and all the power supplies for Q_A, Q_B, and Q_C to be off when the builtin TEST signal is selected.

Y/PB/PR SIGNAL PROCESS, AND G/B/R APERTURE CONTROL CIRCUIT (BB BOARD)

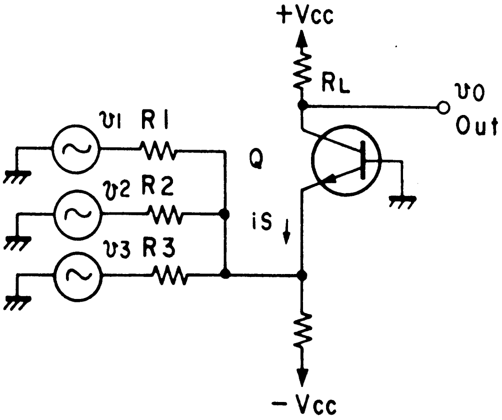
The BB board comprises the functions such as GBR/YPBPR selection, YPBPR to GBR conversion, and aperture control. Major circuit blocks are the YPBPR signal process circuit and the GBR aperture control circuit.
IC6, IC7, IC8 (LA7016) are the GBR/YPBPR select switch. When YPBPR input is selected, input signals are routed through the YPBPR signal process circuits and are then input to the RGB aperture control circuit. When the GBR input is selected, input signals are directly applied to the GBR aperture control circuit. When YPBPR input is selected, the PR and PB signals are fed to the analog switches of IC1, IC3 that is the switch in order to separate the PR and the PB signals in the B&W mode. The Y signal is input to the analog switch of IC2 that is the selection switch of either internal TEST signal or the Y signal. Therefore, the TEST signal is input to the Y signal circuit in the YPBPR signal process circuit in place of the Y signal. These YPBPR signals are passed through respective analog switches and then fed to the YPBPR to GBR conversion matrix circuit. Its output GBR signals are fed to the selector switches of IC6, IC7, IC8 7 pins where either the matrix output GBR or the direct input GBR are selected. The output signals are routed to the GBR aperture control circuits and to the COLOR/B&W select switches, and then fed to the output.

YPBPR to RGB Conversion Matrix Circuit

This conversion is performed in order to realize the following equations.

$$\begin{pmatrix} G \\ B \\ R \end{pmatrix} = \begin{pmatrix} 1 & -0.226 & -0.477 \\ 1 & 1.826 & 0 \\ 1 & 0 & 1.576 \end{pmatrix} \begin{pmatrix} Y \\ P_B \\ P_R \end{pmatrix} \cdots\cdots \textcircled{1}$$

This conversion requires the addition of the video signals. The video signal adding is performed by the following circuit.



Now the video signals v1, v2, v3 are respectively multiplied by the coefficients K1, K2, K3, and are added together. That is:

$$v_O = K1v1 + K2v2 + K3v3 \cdots \textcircled{2}$$

The equation mentioned above can be obtained.
Assuming that the emitter resistence "Re" of the transistor "Q" whose base has been grounded in the Fig. is exceedingly small as with R1, R2, and R3, the signal current "is" which flows to the emitter of "Q".

$$is = \frac{v1}{R1} + \frac{v2}{R2} + \frac{v3}{R3} \cdots \textcircled{3}$$

If hfe of the transistor Q is high enough, approximately the "is" CURRENT FLOWS IN THE Q's collector. So, output from the collector is the voltage "vo":

$$v_O = R_L is = \frac{R_L}{R1} v1 + \frac{R_L}{R2} v2 + \frac{R_L}{R3} v3 \cdots\cdots\cdots \textcircled{4}$$

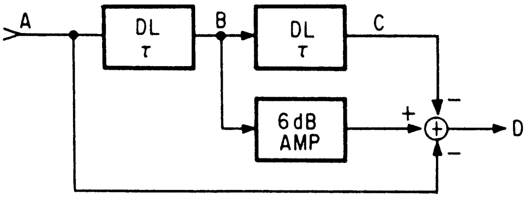
Therefore the above described coefficients are:

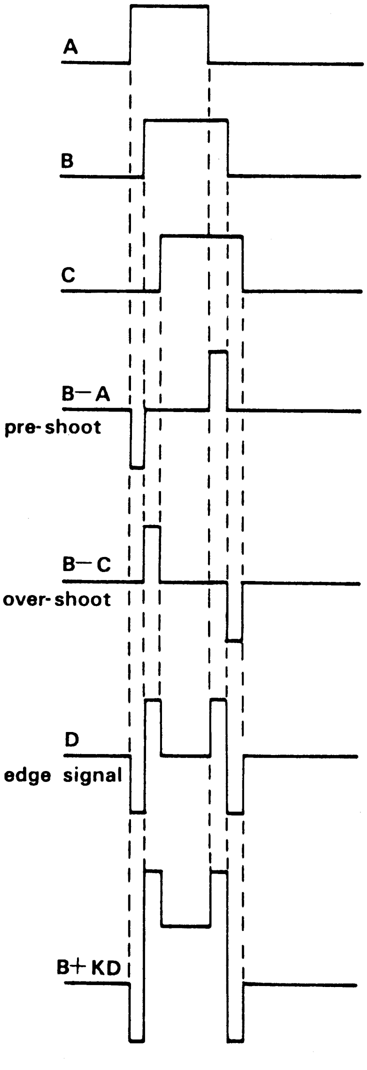
$$K1 = \frac{R_L}{R1}, \quad K2 = \frac{R_L}{R2}, \quad K3 = \frac{R_L}{R3} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots \textcircled{5}$$

Followings are the description using the actual circuit. The PR signal is buffered by Q1, Q2, the Y signal is buffered by Q9, Q10 and the PB signal is buffered by Q17/Q18 respectively and are routed to the matrix circuits. Since the PR signal and the PB signals are having negative coefficient as shown in equation 1, polarity inversion is needed. The polarity inversion is performed by IC4 and IC5 (BX1190). The matrix is performed by Q3, Q11, Q19. The matrix output GBR signals at respective collectors are routed to the emitter followers of Q4, Q12, Q20, then to the level shift of D6, D12, D15, and are finally output.

Aperture Control Circuit

This circuit is adding pre-shoot and over-shoot to edge signal of the video image. Therefore, edge signal is emphasized by this circuit. This circuit uses delay lines in order to generate the edge signal by addtion/subtraction operation among the delay line output signals. The output edge signal is then added to the original video signal. Its operating principle is shown in the following illustration. The signal A is the original video signal. The signal B is the delayed video signal where the signal A is delayed by "τ" to make the signal B. The signal C is the further delayd signal where the signal B is again delayed by "τ" to make the signal C. The pre-shoot signal is made by B−A subtraction. The over-shoot signal is made by B−C subtraction. The pre-shoot and the over-shoot are added to make the edge signal of 2B−(A+C) is obtained. Amplitude of this edge signal is adjusted and is added to the video signal B. Then the edge-corrected video signal is obtained. This is the fundamental idea of the aperture control operation.





Frequency response of this aperture correction circuit is obtained as follows. When the sinusodial wave signal ($E\sin 2\pi ft$) is input.

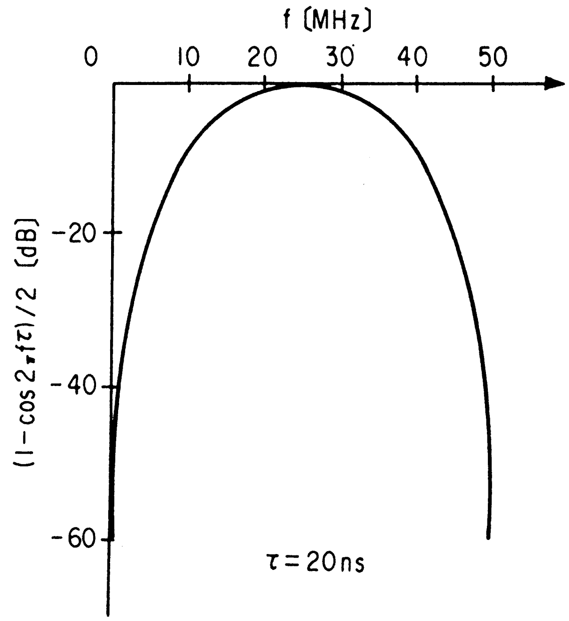
$$D=-E\sin 2\pi ft=2E\sin 2\pi f\,(t-\tau)-E\sin 2\pi f\,(t-2\tau)$$
$$=2E\,(1-\cos 2\pi f\tau)\,\sin 2\pi f\,(t-\tau)$$

Therefore the output is the delayed signal of the input signal by "τ", having the gain of $2E\,(1-\cos 2\pi f\tau)$.
The frequency whereby the gain becomes maximum is written into the following equation.

$$\cos 2\pi f\tau=-1$$

from the above, it becomes $f=\dfrac{1}{2\tau}$

Since the delay line of $\tau=20$ ns is used, it becomes a 25 MHz MAX aperture circuit.
The frequency response of D is shown in Fig. below.



The aperture control circuit in the Bʙ board is to generate the edge correction signal for the G, B, R signals. The method to generate the edge signal is as follows. Y signal is first generated from the RGB signals by matrixing them. The Y signal is fed to the edge signal generating circuit where the edge signal is generated for the Y signal. This edge signal is gain-controlled and is distributed to respective G, B, R signals.
Following is the circuit description referring actual circuit. The resistor matrix network is located in the emitter circuit of the common-base transistor Q25. As the GBR signals are fed to this matrix network, the Y output signal is output from Q25 collector. This Y signal output is passed through emitter follower Q26, level shifter D19, and is output from emitter follower Q27. This Y signal output is again buffered by Q28, 20ns delayed by the delay line DL4. It is again buffered by Q29/Q30 and 20ns delayed by DL5.

The afore-mentioned A, B, C signals are thus generated. Addition and subtraction of these three A, B, C signals are performed by Q36. The output is obtained from Q36 collector in the form of electric current. This current output is routed to differential amplifier of Q32, Q33 common emitter circuit so that the amplification gain controlled by the voltage difference between the bases of Q32 and Q33. Its output is taken from Q33 collector, amplified by Q34, buffered by emitter follower Q35. This edge signal output is added to the G, B, R signals respectively. The B&W signal during B&W mode is also extracted from the emitter of Q30 in this circuit. Since edge signal generation and its gain controlling circuit provide some delay, the Y signal is delayed by the delay line DL6, and is sent to the COLOR/B&W select switch IC9, IC10, IC11 (LA7016). The R, G, B signals are at the same time, delayed by the delay lines DL1, DL2, DL3 respectively. These delay lines have the equivalent delay time as that of DL4 + DL6 respectively. The delayed R, G, B signals are applied to the COLOR/B&W select switch where the select switch output and the aforementioned gain-controlled edge signal are mixed in the emitter circuits of the common base mixers Q7, Q15 and Q23. The mixed outputs are obtained from their collectors, buffered by Q8, Q16, Q24, and level-shifted by D10, D14, D17 and are output.
This is the aperture control for the GBR signals.

CONTRAST AND GAIN CONTROL CIRCUITS (B_D BOARD)

The circuit operation for the R channel is explained. It is the same for the G and B channels.

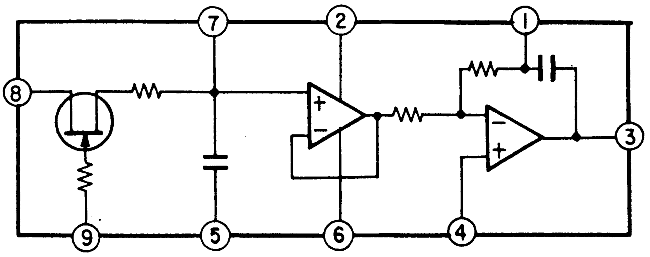
Clamp Circuit

The circuit consisting of Q101 to 105 is an amplifier with a dc level shift function. The gain is determined by

$$\frac{R107}{R103 /\!/ R104} \cdot \frac{R111}{R109}$$

It is about 1.4 times.
The dc level shift is performed by giving an arbitrary dc to the base of Q104.
IC101 (BX-1313) is a comparator with a sample hold circuit as shown in the figure below. It samples the signals input from pin 8 while pin 9 is at the high level. The sampled voltage is held at pin⑦until pin⑨goes again to the high level.
This voltage, V, is compared with the reference voltage Vref assigned to pin④. The low level is output from pin③if V>Vref and the high level if V<Vref.
Entering a clamp pulse to pin⑨and connecting pin 3 to the base of Q104 allow the pedestal level of the output of the emitter of Q105 to be fixed to Vref. Vref is sent from the B_G board. In the delay mode, Vref is increased, which raises the pedestal.
C107 is a capacitor compensating the time constant for clamp.

Schematic circuit diagram of IC101 (BX-1313)



Video/Reference Pulse Selector SW

IC102 (LA7016) is an analog SW. The clamped video signal is input to pin②and the clamped reference pulse to pin⑦. The reference pulse, a mixture of the Bright Pulse and Contrast Pulse, is created in the B_G board. The Bright Pulse is used to detect a cathode current (to be described in detail later in connection with the C_A board). The contrast pulse is inserted during the H blanking and has its level changed by the contrast VR. The SW selector control signal is input to pin③. This signal permits SW to be turned to the pin⑦side only while the reference pulse is issued. As a result, the signal composed of the video signal to which the reference pulse is inserted is output from pin④.

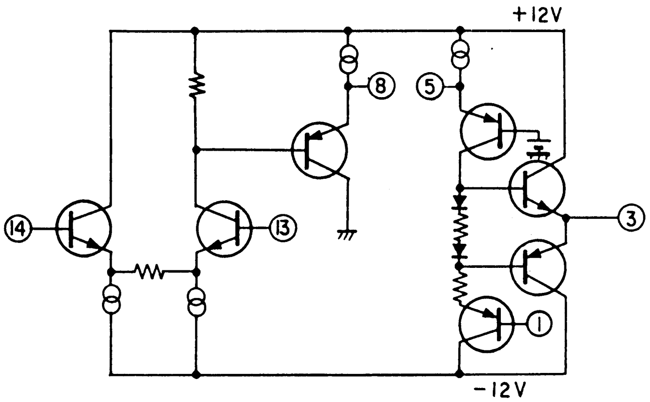
RGB ON/OFF Circuit

The signal for RGB ON/OFF SW on the subcontrol panel in the drawer is input to the base of Q108. For example, when SW is turned to R OFF, Q108 turns on, forcing pin③of the preceding IC102 to go low, which switches the input of IC102 to the pin⑦ side and stops the video signal output on the pin②side.
The Sync Detect signal sent from the BF board also control is used to control IC102. When Sync Detect is low (Sync is not input), the same operation as RGB OFF takes place.

Contrast/Gain Control Circuit, Pedestal Clamp Circuit

The IC103, 104, 106, and 107 make up the Contrast/Gain control circuit and pedestal clamp circuit.
IC103 is a differential amplifier capable of shifting the DC level as shown in the figure below. Connecting a variable resistor between pin⑤and pin⑧permits gain control. Giving a DC to pin 1 allows level shifting.

Schematic circuit diagram of IC102 (BX-1315)

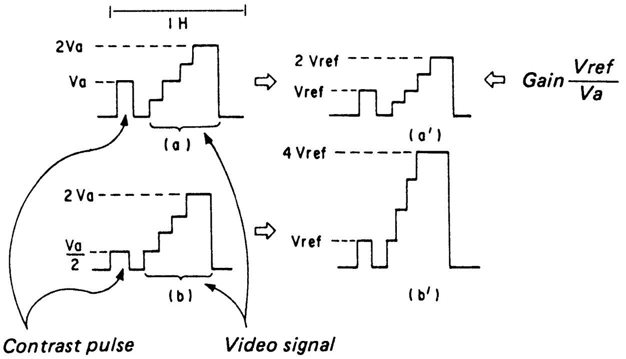


IC104 is used for the variable resistor between pins⑤and⑧. It is a voltage control variable resistor with V4 and V6 as control voltages. The resistance (R13) between pins①and③changes by varying the voltages V1−V6 and V3−V4. (V1−V6 indicates indicates the potential between pins 1 and 6 .)
V4 is controlled by the contrast VR and gain VR.
C119 is used to modulate V6 with the V1 signal and obtain V1 − V6 = V3 − V4 = DC.
Without C119, V1 − V6 = AC and R13 would be modulated by V1, which leads to a waveform distortion.
Q106 is attached to permit the voltage at pin⑥to follow immediately pin④when the voltage at pin④of IC104 is changed. Q106 turns on during the H blanking.
IC107 controls the resistance value of IC104 by sampling the contrast pulse. The contrast pulse sampling pulse with the same timing as the contrast pulse is input to pin⑨. The video signal with the

contrast pulse inserted is input from pin⑥and the level V of the contrast pulse is sample-held. V is compared with the reference voltage Vref input from pin④. The low level is output from pin③if V>Vref and the high level if V<Vref. This output is resistor-divided and input to the base of Q107, and the inverted output is input from the collector of Q107 to pin④of IC104. In other words, if V>Vref, pin④of IC104 goes to high level, increasing the resistance value of IC104, which reduces the gain of IC103, dropping V. Finally, V = Vref.

In this way, the contrast pulse level remains constant by a feedback even if there is a drift in IC103, 104, or 105.

How to control the contrast is explained next.



Suppose the signal such as (a) in the above figure is input to IC103. Then, as described above, a feedback occurs so as to set the contrast pulse level to Vref for the IC105 output, and the video signal level becomes 2 Vref. Similarly, when the signal such as (b) is input to IC103, the IC105 output becomes 4 Vref.

Changing the level of a contrast pulse in this way enables contrast control. The level of the contrast pulse is controlled by the B_G board.

The drive volume is controlled by changing Vref. The gain VR on the subcontrol panel in the drawer is input to pin④of IC107 via R140 for Vref adjustment.

IC106 is used for pedestal clamp. Its operation is the same as that of IC101 in the calmp circuit described earlier.

Buffer Amplifier

IC105 is a video amplifier with an open loop gain of about 30 times. It sends a signal to the CA board at 75Ω.

TEST SIGNAL GENERATION (B_E BOARD)

Clock Oscillation Stage with X1, IC1 (4A), IC2 (4B)

IC1 (4A) and X1 are used to oscillate about 48MHz which is divided to 1/4 by IC2 (4B) for a system clock at about 12MHz.

H Periodic Signal Generation with IC3 (2C), 4 (3C), 5 (4C), 6 (3D), 7 (3E)

The hexadecimal counters of IC3, 4, 5 generate 9-bit digital quantities (0 to 362 counts in 1H) for an IC6 address. IC6 stores eight types of timing data, namely, $2F_H$, H.SYNC, B1, H. HATCH, G1, G2, LATCH CLK, and CLEAR. These are latched by IC7 for output.

V Periodic Signal Generation with IC8 (1F), 9 (2F), 10 (2E), 11 (1E), 12 (1J), 13 (2J)

As in the above item, with $2F_H$ pulse as a clock, 1125 counts are taken, and the signals V. Sync, B2, V. Sync', V. Hatch, G3, G4, G5, and Clear are output in the corresponding timing. G3 to G5 are latched with H. Sync.

H.V Pattern Signal Generation with IC15 (1E), 16 (1D), 17 (1C), Q7

According to the B1, G1, G2, B2, G3, G4, G5, CONT A, and CONT B inputs above, the output video level is controlled and video signals "SET UP", "FLAT FIELD", and "GRAY SCALE" are created. The level control (D/A converter) is performed by the constant current source of Q7, resistor array, and open-collector array.

Hatch Signal Generation with IC21 (2D), 23 1/4 (3J 1/4), Q6

The H HATCH signal is given the pulse width of about 35ns by R15 and C15, combined with the V HATCH signal, and applied to the base of Q6. For the output from IC17, FLAT. F is selected automatically when HATCH is output, and HATCH is composed in Q6.

Sync Generation

The actual H. Sync, V. Sync, and Comp Sync are generated by the timing signals Sync, V Sync, and V Sync' above.

H. Sync and V. Sync are output at the inverter open-collector (pulled up to (+) power), and Comp Sync is output via the buffers Q8 and Q9.

Video Buffers Q4, Q5

The above H.V pattern signal and Hatch signal are output at 75Ω by passing through Q4 and Q5.

Invert, Dot, and Brightness Control with IC23 (3J), 24 (4H), 25 (4G), 26 (4F)

External signals are used to perform partial brightness control of the video output or the composition of Invert, and Dot signals for the Hatch signal.

If the external input is open, all are set by design to NORMAL.

Input/Test Control Q1 to Q3

The external Input/Test signals are used to turn on/off the +5V line to prevent an interference between the external input video and BE video at input time.

Generation of the PLUGE Signal (IC27, Q14 and Q15)

The PLUGE signal is superposed to the video signal generated by IC17 and output. When the PLUGE signal is set, the black signal data is output from IC17. When the PLUGE signal is not set, its output is inhibited by the signal from ④-pin of BB-14.

PULSE GENERATOR (BG BOARD)

Pulse Generator Circuit to generate BRIGHT Pulse

Timing Generator Circuit for Brightness Pulse and Related Pulses

The brightness pulse, BKG sample pulse, gate pulse and video/REFP pulse used by the previously explained (3-13) bias and brightness control circuit are generated at this circuit.
The timing of these pulses is as shown on fallowing the timing chart.
The H and V pulses generated at the deflection circuit (D board) are input to the CLK and CLR terminals of the counter composed of IC304 and IC305 to produce these pulses.

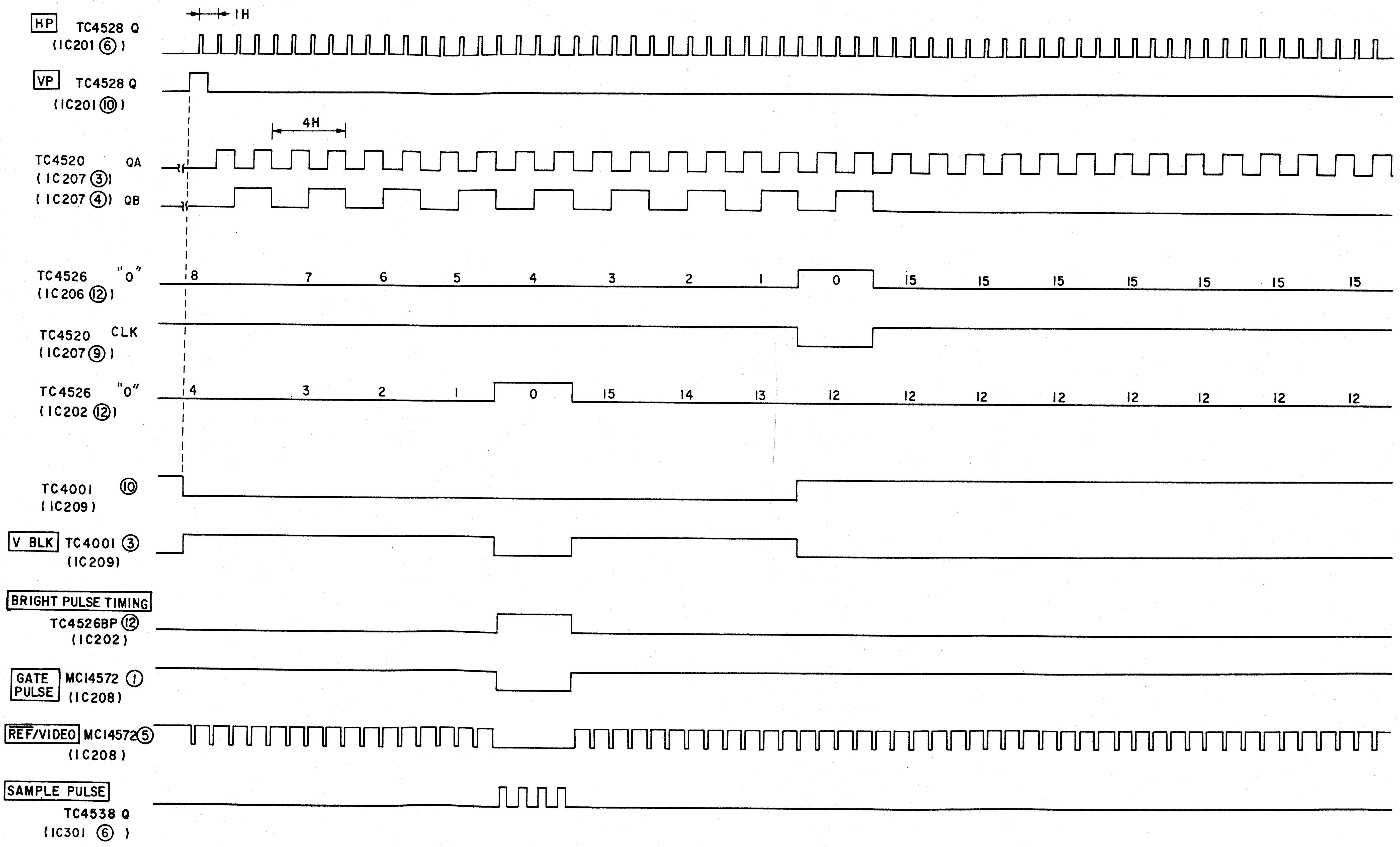
Timing Generator Circuit for Contrast Pulse and Related Pulses

The contrast pulse and contrast sample pulse used by the previously explained (3-11) gain and contrast control circuit are generated at this circuit.
The timing of these pulses is as shown on the following timing chart. Their are generated from the H pulse generated at the deflection circuit (D board).

Reference Pulse Generator Circuit

The reference pulse is a combination of the brightness and contrast pulses. This pulse is superposed to the video signal at the BD board, then it is used at the bias and gain control circuit and the gain and contrast control circuit.
The brightness pulse amplitude can be changed with the brightness control on the front panel, and the contrast pulse amplitude with the contrast control.
Brightness and contrast control voltages are finally sent to the buffer inside IC102, and sampled by the above-mentioned brightness timing and contrast timing pulses at IC105 to become the brightness and contrast pulses.
These pulses are added by the adder composed of Q110 to Q113.
The resulting pulse is clamped at the clamp circuit including Q115 to Q117 and IC103, then output as the reference pulse.

BG Board Timing Chart (relating to BRIGHT PULSE)


1H
HP TC4528 Q (IC201 ⑥)
VP TC4528 Q (IC201 ⑩)
4H
TC4520 QA (IC207 ③)
(IC207 ④) QB
TC4526 "0" (IC206 ⑫)
8 7 6 5 4 3 2 1 0 15 15 15 15 15 15 15
TC4520 CLK (IC207 ⑨)
TC4526 "0" (IC202 ⑫)
4 3 2 1 0 15 14 13 12 12 12 12 12 12 12 12
TC4001 ⑩ (IC209)
V BLK TC4001 ③ (IC209)
BRIGHT PULSE TIMING TC4526BP ⑫ (IC202)
GATE PULSE MC14572 ① (IC208)
REF/VIDEO MC14572⑤ (IC208)
SAMPLE PULSE TC4538 Q (IC301 ⑥)

Delay Control Circuit

In the delay mode, this circuit increases contrast pulse amplitude and decreases brightness pulse amplitude. This results in less contrast and more brightness.
Clamp voltage of the B_D board is also changed.

ABL Circuit

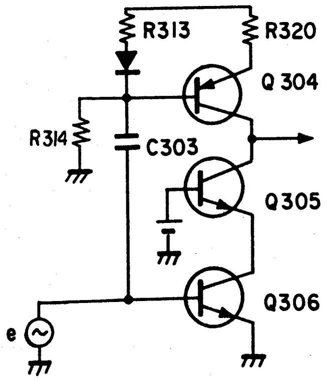
Q101 to 104 form a contrast ABL circuit. The ABL detect voltage V_{ABL} detected on the E board is input to the base of Q101. When the ABL current increases, V_{ABL} is dropped, and when V_{ABL} is lower than the base voltage of Q102, Q102 turns on, raising the Q103 collector voltage, which turns on Q104. This forces the level of the Contrast Pulse input to pin④ of IC101 to be raised, which lowers the contrast. When the contrast is lowered, the ABL current is reduced. The ABL current is limited in this way.

VIDEO OUTPUT (C_A BOARD)

The circuit operation of the R channel is explained since the R, G, and B have the same circuit.

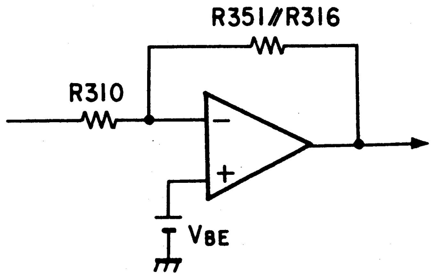
Video Output

Q301, 302, and 303 are buffers. The output of the buffers is input to the amplifier composed of Q304, 305, and 306. This amplifier is a feedback amplifier with R315 and 316 as feedback resistors. The circuit with the feedback resistors removed is shown below.



The basic part of this amplifier circuit is the amplifiers Q306 and Q305 in cascade with the current source of Q304 serving as their load resistor.

Connecting C303 between the bases of Q304 and Q306 drives the Q304 in the ac sense so that Q304 and Q305 will perform complementary operation.
The open loop gain is almost infinite.
The equivalent circuit of this amplifier with a feedback resistor is shown below. The gain is determined by (R315/ /R316)/R310.



Q309 and 310 are buffers. The output is sent to the cathode of CRT via the C_B board.
Q307, 308, and 311 form a circuit that cuts off Q309.
When the base is Q311 goes to low level, Q307 and Q308 turn on, which cuts off Q309.
At this time, the collector current of Q310 is the cathode current flowing from the terminal C_A-9. The cathode current can be detected by attaching a resistor R901 to the collector of Q310.
The pulse (Gate Pulse) that turns on/off Q311 is sent from the B_G board.
This pulse has the same timing as the Bright Pulse. The cathode current at the time the Bright Pulse is sent to the cathode is detected at R901.

G1 Circuit

This circuit provides independent control of G1 voltages for R, G, and B. Q410 to 413 shape the waveform of the blanking pulse sent from the deflection system and output the pulse with amplitude of 120 Vp-p. This pulse is sent to each G1 circuit of R, G, and B. The G1 circuit for R is explained below. The G1 voltage control signal is input to the base of Q407. This voltage is amplified by the amplifiers Q407, 408 and output via the buffer Q409. (V_G1) D403, a clamp circuit, clamps to V_G1 the high level of the blanking pulse generated by the previously explained Q410, 411. This output is sent to G1 of CRT via the C_B board. When the R ON/OFF SW in the subcontrol panel is turned off, the voltage input to the base of Q407 goes to GND level. When the Q407 base is at the GND level, Q408 is cut off, which sets G1 to about −120V and cuts off the beam.

White Balance Stabilizer

The circuit operation for the R channel is explained. The cathode current in the following description is that in the period where the Bright Pulse is illuminated. The cathode current detect voltage is input to pin③of IC901. This voltage is input (as V8) to pin⑧of IC902 (BX-1313) via the buffer IC901 (TL082 1/2). V8 is sample-held by the sample pulse input to pin⑨and compared with the voltage input to pin④. If V8>V4, the output pin③(the voltage is named V3) goes to low level and if V8<V4, pin③ goes to high level. Suppose V8<V4. V3 is resistor-divided by R904, 905 and sent to Q407 via IC903 (TC4053) and IC902 (TL082 2/2).
Since the high level voltage is input to Q407, the collector voltage of Q408 rises, which raises the G1 voltage.
When the G1 voltage is raised, the cathode current is increased, which raises the voltage at pin③of IC901.
In this way, a feedback operates to enventually give V8 = V4. The cathode current during the Bright Pulse period is V4/R901 and remains constant. That is, the brightness of the Bright Pulse is constant. This brightness is set only by V4 and R901, and not affected by a circuit drift. This stabilizes the white balance.
RV901 is the G1 control VR when the feedback is available.
RV902 is the G1 control VR when the feedback is unavailable.
RV802 may be spared except for the following reason. If the drive volume is changed with the feedback applied, the black level changes. Accordingly, both must be tracked and the adjustment becomes rather troublesome. Accordingly, first cut off the feedback loop with RV902 and then decide the black level, and adjust the drive volume. Now, apply the feedback and decide the black level with RV801. This eliminates the need for tracking.
The reason for changing the G1 by detecting the cathode current is this: This circuit has the following merit compared with the circuit in which a feedback is applied to keep constant the voltage between the cathode and G1. Namely, it can stabilize the black balance including the CRT drift as well as the circuit drift.
Even if EKCO of CRT drifts, the black level remains constant.

Remote Control Input (Q_D Board)

The pin connection in the remote control and the operation mode are related as follows:

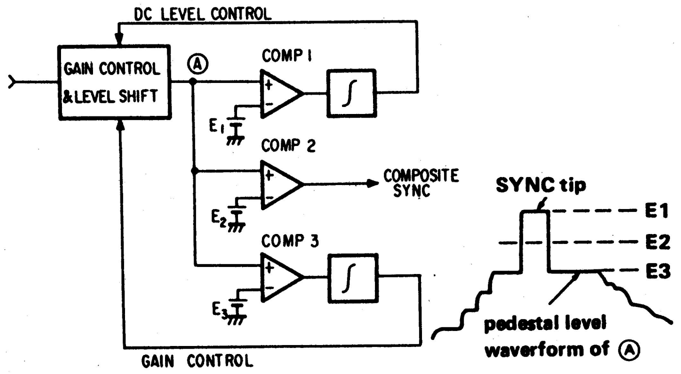
PIN		OPEN	GND
1	MODE	COLOR	B&W
2	INPUT	A	B
3	TALLY LAMP	ON	OFF
4	SYNC	INT	EXT
5	LOCAL/REMOTE	LOCAL	REMOTE

Setting pin ⑤ to the GND potential operates remote control and setting pin ⑤ to OPEN operates the SW on the front panel.
In the operation mode by remote control, the operation is independent of the positions of SW on the front panel.

SYNC PROCESS CIRCUIT (B_F BOARD)

Sync Separator Circuit having Sync AGC Function

In order to establish the AGC circuit using input sync signal as the reference signal, an amplifier that can detect and control the amplification gain and dc level is necessary.
Fundamental circuit is shown in the following illustration.
The sync signal is amplified by the GAIN CONTROL & LEVEL SHIFT amplifier that provides the inverted output to each of the comparators of COMP-1, -2, -3. The comparator COMP-1 provides output so that the sync tip's dc level becomes E1 as shown in the illustration. The other comparator COMP-3 provides the GAIN CONTROL signal so that the output pedestal portion has the E3 level. These control signals are fed back to the GAIN CONTROL & LEVEL SHIFT amplifier so that the comparator COMP-2 provides the composite sync signal having the specified sync amplitude and dc level.



The GAIN CONTROL & LEVEL SHIFT circuit is consisted by the IC102, Q108, 109, 110. The gain control is done by IC102 MC1496 double balanced type differential amplifier. Its output is the current output that is input to Q108 common base amplifier's emitter. It is fed then to Q109 common emitter amplifier where output is taken from its collector and sent to Q108 emitter through R141 for negative feedback. Its output is beffered by Q110 emitter follower. The dc level control is performed by changing the dc current flowing into Q108 emitter.
In this sync agc circuit, the sync tip is fixed by the dc level control while the pedestal level is determined by the gain control. The output signal from Q110 emitter is input to Q111 comparator where signal is integrated with shorter time constant in order to react to the sync tip. The signal is fed back by Q112, 113 emitter follower in order to clamp the sync tip potential to the Q111 base potential. This integrator has the

shorter time constant for sync period while it is designed to have longer time constant for video period by D102, R158 in order to hold the sampled value during the video period.
The output signal from Q110 emitter is sent to Q115 comparator that is the integrator to react only to the pedestal portion, not to the sync portion, by having the long time constant. The signal is then fed back by Q117 emitter follower in order to clamp the pedestal level to the Q115 base potential by determining the gain control factor. The sync top level and the pedestal level is thus fixed so that the sync signal amplitude is always constant. This signal is sent to Q114 comparator where sync signal alone is separted, and output through complementary buffers of Q119, 120. The negative polarity sync is thus output.

Equalizing Pulse Extractor Circuit

IC104 (2/2) is a equalizing pulse extractor circuit. It generates a pulse that has approximately 3/4H pulse width with the monostable multivibrator IC104. And the equalizing pulse is extracted by feeding back the inverting output (pin 9 output of IC104) to pin 11 of IC104 in order to mask the equalizing pulse.

Back Porch Clamp Pulse Generator Circuit

IC103, IC203, IC204, IC205, Q201, Q202 and Q203 are the back porch clamp pulse generator circuit. When HD is input, the HD phase is delayed by the monostable multivibrators IC103 and IC203 so that back porch clamp pulse of negative polarity is output from pin 9 of IC203. When INT SYNC or EXT SYNC is input, back porch clamp pulse of negative polarity is output from pin 9 of IC204 in the same manner. Clamp pulse is selected by IC205, and polarity inversion and waveform shaping are performed by Q201. Then back porch clamp pulse of positive polarity is output from complementary buffer consisting of Q202 and Q203.
Control signal of selector IC205 is sent from the sync signal detector circuit consisting of IC205, IC206 and Q204.
When the sync signal is output from the sync separator circuit, the clamp pule is generated from the latter signal regardless of HD input.

V SYNC Selector Circuit

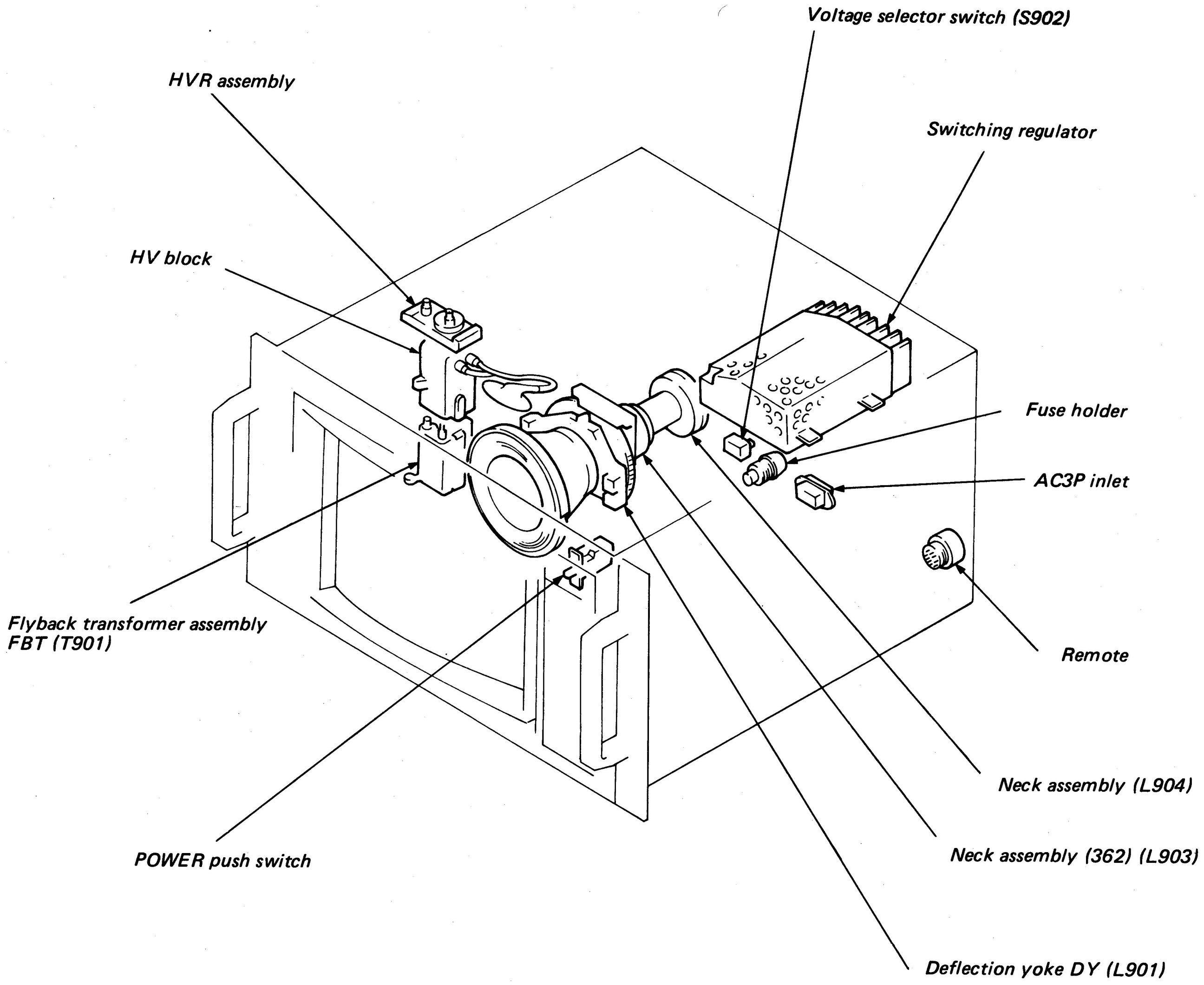
Q304, Q305, Q306, IC201 (2/4) and IC301 are the V SYNC selector circuit. HD signal, COMPOSITE SYNC signal or TEST V SYNC signal is selected by IC301.

H SYNC Selector Circuit

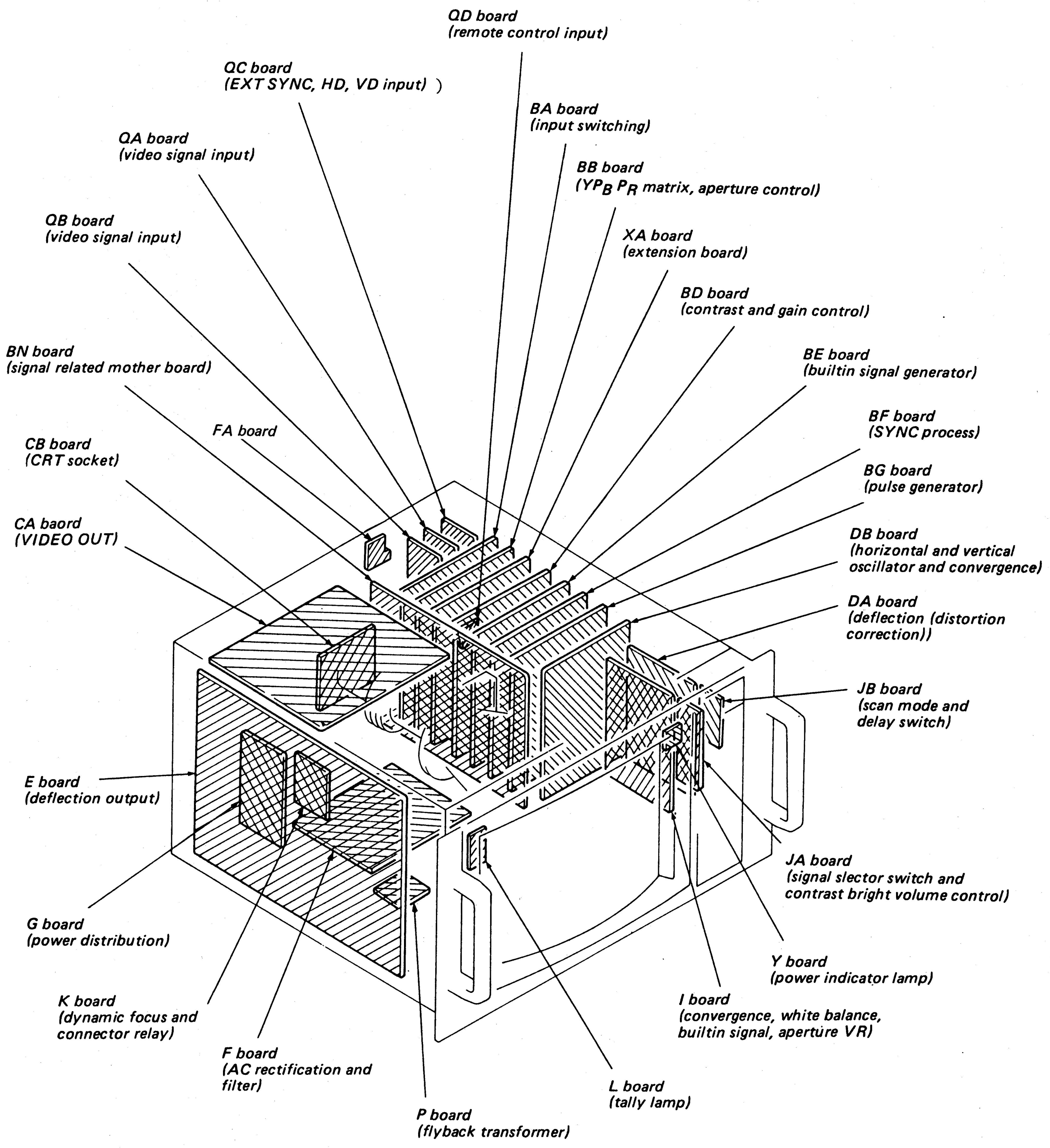
IC105 is a H SYNC selector circuit. When the HD signal is input, it outputs the HD signal, and if not, outputs the COMPOSITE SYNC signal.

SECTION 4
ADJUSTMENTS

4-1. INTERNAL VIEWS


Voltage selector switch (S902)
HVR assembly
Switching regulator
HV block
Fuse holder
AC3P inlet
Remote
Flyback transformer assembly
FBT (T901)
Neck assembly (L904)
POWER push switch
Neck assembly (362) (L903)
Deflection yoke DY (L901)

4-2. CIRCUIT BOARDS LOCATION


QD board
(remote control input)
QC board
(EXT SYNC, HD, VD input))
BA board
(input switching)
QA board
(video signal input)
BB board
(YP_B P_R matrix, aperture control)
QB board
(video signal input)
XA board
(extension board)
BD board
(contrast and gain control)
BN board
(signal related mother board)
BE board
(builtin signal generator)
FA board
BF board
(SYNC process)
CB board
(CRT socket)
BG board
(pulse generator)
CA baord
(VIDEO OUT)
DB board
(horizontal and vertical oscillator and convergence)
DA board
(deflection (distortion correction))
JB board
(scan mode and delay switch)
E board
(deflection output)
JA board
(signal slector switch and contrast bright volume control)
G board
(power distribution)
Y board
(power indicator lamp)
K board
(dynamic focus and connector relay)
I board
(convergence, white balance, builtin signal, aperture VR)
F board
(AC rectification and filter)
L board
(tally lamp)
P board
(flyback transformer)

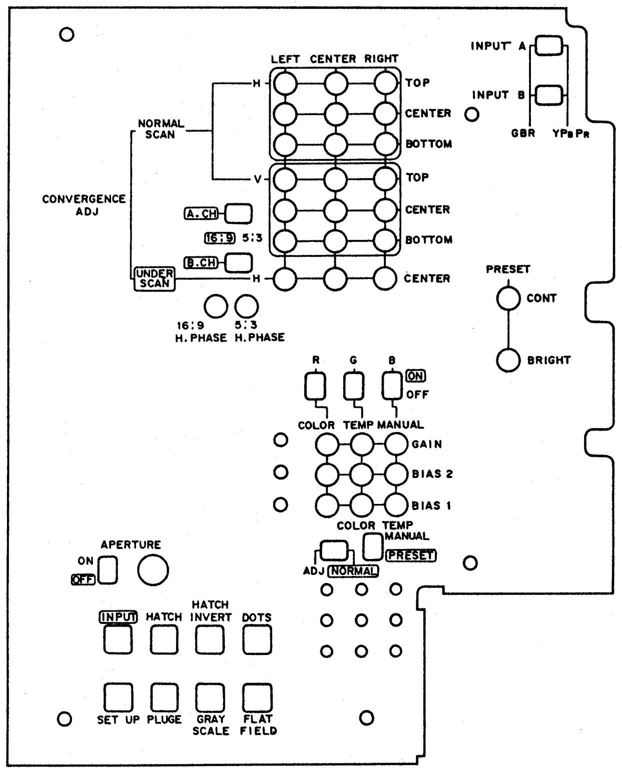
4-3. QUICK REFERENCE

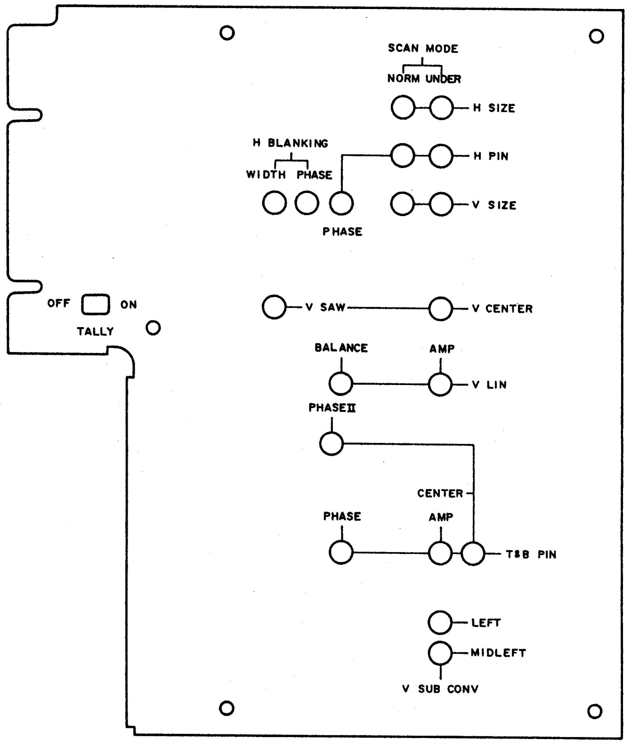
BOARD SECTION	BA	BB	BD	BE	BF	BG	BN	CA	CB	DA	DB	E
CIRCUIT DISCRIPTION	3-9	3-9	3-12	3-13	3-18	3-14	—	3-17	—	3-1	3-1	3-6
ADJUSTMENTS	—	4-28	—	4-30	4-31	4-35	—	4-37	—	4-18	—	—
BLOCK DIAGRAM	5-1	5-1	5-2	5-1	5-2	5-2	—	5-2	5-4	—	—	5-4
MOUNTING DIAGRAM	5-11	5-19	5-25	5-27	5-35	5-37	5-47	5-51	5-53	5-59	5-60	5-67
SCHEMATIC DIAGRAM	5-13	5-17	5-23	5-29	5-32	5-39	5-44	5-56	5-58	5-63	5-65	5-71
ELECTRICAL PARTS LIST	7-1	7-10	7-7	7-13	7-15	7-18	7-7	7-20	7-25	7-31	7-25	7-28

BOARD SECTION	F	FA	G	I	JA	JB	K	L	P	QA	QB	QC
CIRCUIT DISCRIPTION	3-8	—	3-8	3-2	—	—	—	—	—	3-8	3-8	3-8
ADJUSTMENTS	—	—	—	—	—	—	—	—	—	4-26	—	—
BLOCK DIAGRAM	5-3	—	5-3	5-2	5-2	5-3	5-4	5-3	5-4	5-1	5-1	5-1
MOUNTING DIAGRAM	5-52	5-54	5-52	5-74	5-53	5-54	5-67	5-53	5-67	5-83	5-83	5-83
SCHEMATIC DIAGRAM	5-74	5-55	5-56	5-77	5-56	5-56	5-73	5-56	5-73	5-80	5-80	5-80
ELECTRICAL PARTS LIST	7-3	7-4	7-24	7-34	7-33	7-34	7-36	7-34	7-3	7-5	7-6	7-4

BOARD SECTION	QD	XA	Y									
CIRCUIT DISCRIPTION	3-18	—	—									
ADJUSTMENTS	—	—	—									
BLOCK DIAGRAM	5-1	—	5-3									
MOUNTING DIAGRAM	5-84	5-85	5-53									
SCHEMATIC DIAGRAM	5-80	—	5-56									
ELECTRICAL PARTS LIST	7-5	7-36	7-34									

4-4. SUB CONTROL PANEL


INPUT A
INPUT B
GBR
YPBPR
LEFT CENTER RIGHT
NORMAL SCAN
H
TOP
CENTER
BOTTOM
V
TOP
CENTER
BOTTOM
CONVERGENCE ADJ
A.CH
16:9 5:3
B.CH
UNDER SCAN
H
CENTER
16:9 H.PHASE
5:3 H.PHASE
PRESET
CONT
BRIGHT
R G B
ON
OFF
COLOR TEMP MANUAL
GAIN
BIAS 2
BIAS 1
COLOR TEMP
MANUAL
PRESET
ADJ
NORMAL
APERTURE
ON
OFF
INPUT
HATCH
HATCH INVERT
DOTS
SET UP
PLUGE
GRAY SCALE
FLAT FIELD


SCAN MODE
NORM UNDER
H SIZE
H BLANKING
WIDTH PHASE
H PIN
V SIZE
PHASE
OFF ON
TALLY
V SAW
V CENTER
BALANCE
AMP
V LIN
PHASEII
CENTER
PHASE
AMP
T&B PIN
LEFT
MIDLEFT
V SUB CONV

4-5. SETUP ADJUSTMENTS

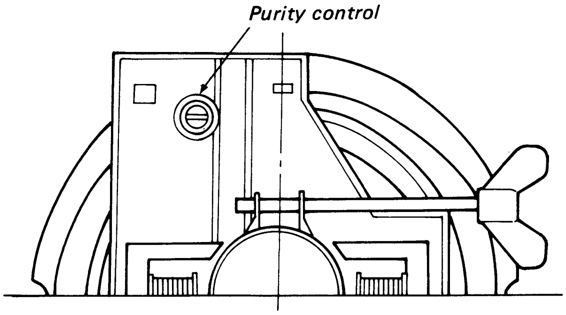
Make the following adjustments when the picture tube has been replaced. Convergence and white balance are normally adjusted using VRs on the sub-control panel. (See Section 1.)

[Tools and instruments required]

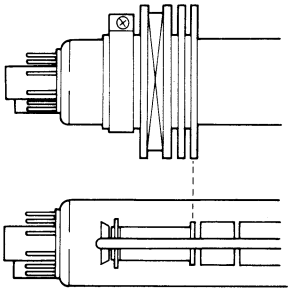
1. Signal generator
2. Oscilloscope
   Sony TEKTRONIX 2465 model or its equivalent
3. Color analyzer
   Minolta TV-Color Analyzer II or its equivalent
4. Digital voltmeter
   Five or more significant digits
5. Tracking scope
   Takeda Riken TR4110 + TR4114T or its equivalent
6. Pulse generator
   HP8007B or its equivalent
7. FET probe
8. Frequency counter

[Landing adjustment]

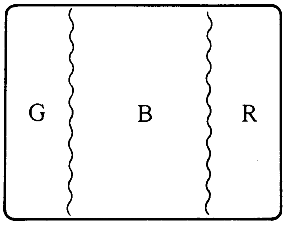
1. Receive a white signal (builtin signal).
2. Preset by CONTRAST MANUAL SW.
   CONTRAST VR fully clockwise.
3. Direct the set to the East (or West) and press the DEGAUSS switch to demagnetize.
4. Position the purity knob to mechanical center.
   Note: Allow at least five minutes before using the DEGAUSS switch again.



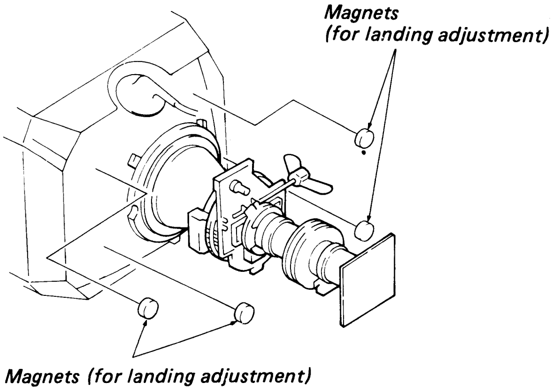
5. Tilt the deflection yoke further away from CRT.
6. Secure the neck assembly at the location shown below.



7. Turn on GREEN (SW2) and turn off RED (SW1) and BLUE (SW3) on the subcontrol panel (I board).
8. Adjust the purity magnet to bring the green to the screen center.
9. Advance DY to obtain the green raster on the entire screen.

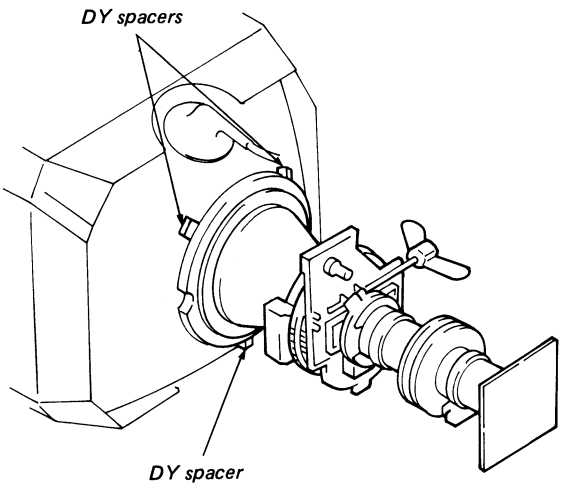


10. Turn on RED SW1 and off GREEN SW2 and BLUE SW3 on the I board.
11. Set the screen to red only and repeat items 8 and 9 above to obtain the red raster.
12. Turn on BLUE SW3 and off RED SW1 and GREEN SW2 on the I board.
13. Set the screen to blue only and repeat items 8 and 9 above to obtain the blue raster.
14. Secure DY with the DY clamping screws.
15. If unable to obtain landing at the corners, compensatė with magnets.
    Note: Be sure to demagnetize when magnets are applied.


Magnets (for landing adjustment)
Magnets (for landing adjustment)

16. If there is a vertical convergence error on the X axis, shake DY to insert wedge-like spacers.

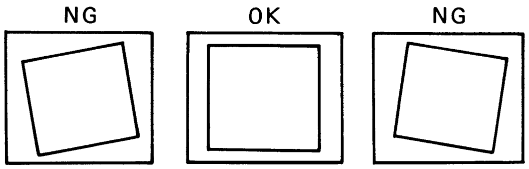
    Note: Leave V. CONV (RV4, 10) on the sub-control panel (I board) at center.


DY spacers
DY spacer

After landing adjustment:

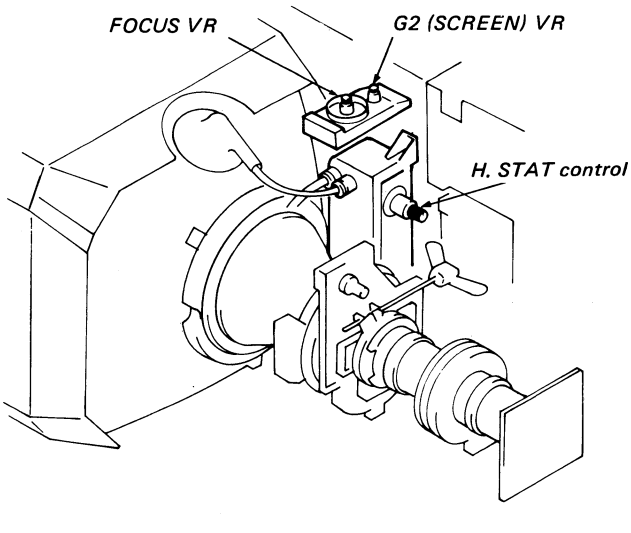
Checking the tilt of the deflection yoke

Check the raster is not tilted.



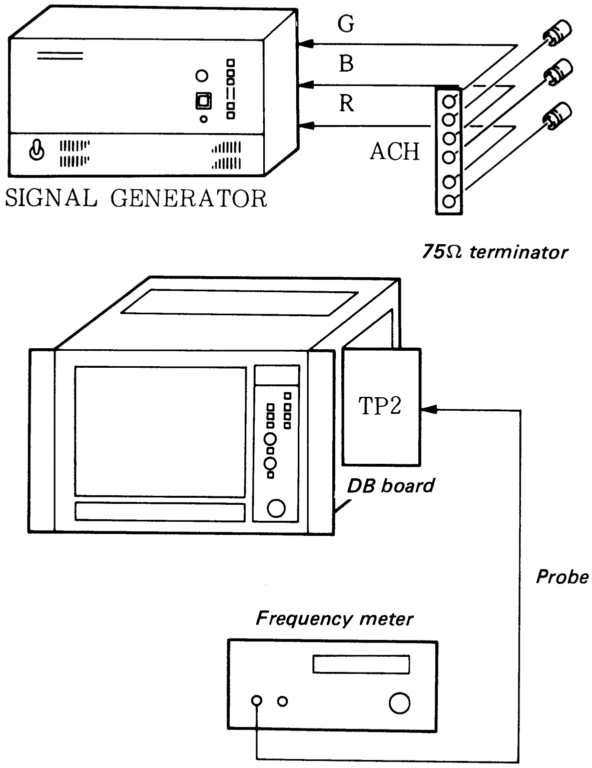
[Focus adjustment]

1. Receive a dot or cross-hatch signal with a builtin or external signal. (A black dot or cross-hatch signal on the white background)
2. Adjust the focus VR for best focus in the central portion of the screen.

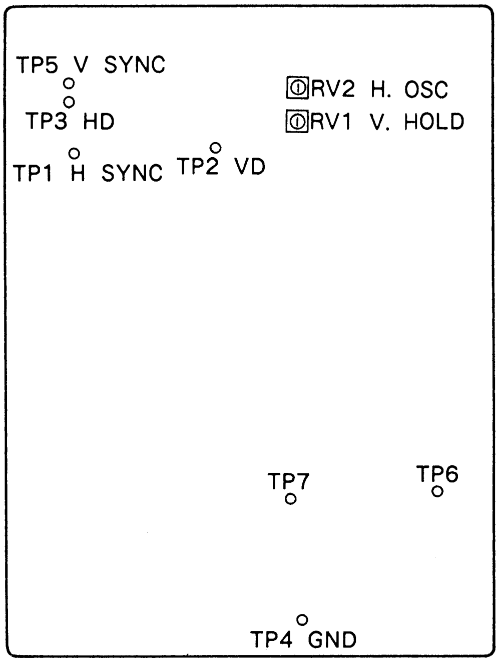

FOCUS VR
G2 (SCREEN) VR
H. STAT control

[fo adjustment] (D_B board)

1. Input a signal from external SG.
2. Connect TP1 (H SYNC) to GND with a clip and adjust RV2 (H OSC) until the horizontally moving image stops.
3. Connect TP5 (V SYNC) to GND with a clip and adjust RV1 V HOLD until the vertical frequency TP2 VD becomes 55 ± 1 Hz. (See Fig. 1-8.)


G
B
R
ACH
SIGNAL GENERATOR
75Ω terminator
TP2
DB board
Probe
Frequency meter

DB board


TP5 V SYNC
TP3 HD
TP1 H SYNC
TP2 VD
RV2 H. OSC
RV1 V. HOLD
TP7
TP6
TP4 GND

[Convergence adjustment]

Preparations

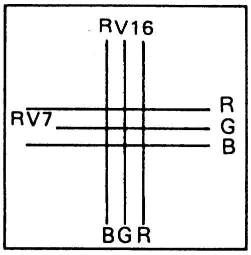
1. Input a cross hatch signal (builtin or external signal).
   Note: The builtin SG may have a different image phase from the received image. This can be adjusted with RGB PHASE (RV1), $YP_B P_R$ (RV2) on the subcontrol panel (I board).
2. Adjust CONTRAST and BRIGHTNESS (on the front panel) for a better cross-hatch view.

[Static convergence adjustment] (The set should face east.)

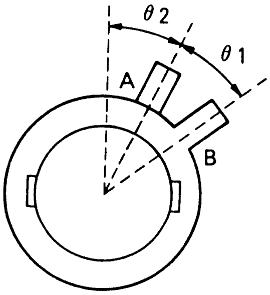
Note: Items 1 through 4, which have already been adjusted, are not required except when DY is replaced.

1. Turn the center VR (RV7, RV16) for V, H convergence on the subcontrol panel (I board) to obtain three parallel lines in red, green, and blue.

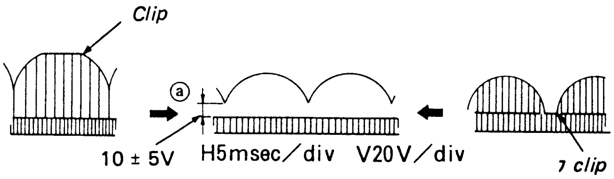
(2)



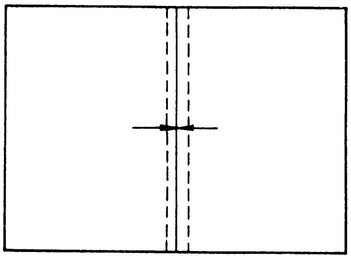
2. For slight horizontal color deviation, turn the H. STAT control in the HV block. (Fig. 1-7)
3. Turn the magnet ring (six-pole) behind DY until the distance between red and green becomes equal to that between blue and green among the three parallel lines. (Change θ1, θ2).



4. Use the volume control on the subcontrol (I board) for coarse adjustment of convergence.
5. Connect a probe to the (+) terminal of C35 on the E board. (See pages 4-7 to 4-9 for the location of E board and C35.)
   Turning the center VR (I board) RV16 for horizontal convergence changes the DC level of a parabola with V cycle in (a) below. Adjust RV16 so that the waveforms will not be clipped at top or bottom.
   Note: Use this adjustment when RV16 does not move smoothly.



6. Turn H. STAT VR in the HV block to correct a horizontal convergence error in the center of the screen.



7. Paint-lock H. STAT VR.

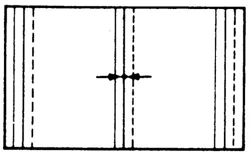
[Dynamic convergence adjustment]

1. Use the convergence control on the subcontrol (I board) for adjustment.
2. Each volume control corresponds to the screen.
3. Red and blue move symmetrically to green and can be adjusted. (Green does not move.)
4. Be sure to follow the sequence from the center to Y axis, X axis, and corner on the screen for adjustment.

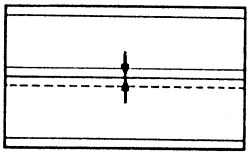
[Convergence adjustment procedure]

1. Input cross-hatch signal and set to NORMAL SCAN.
2. Turn on CONTRAST SW and BRIGHTNESS SW on the front panel, then turn VR clockwise.
3. Adjust RGB at the center of the screen with RV7 and RV16.

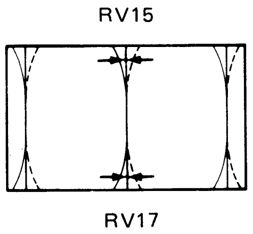
RV16

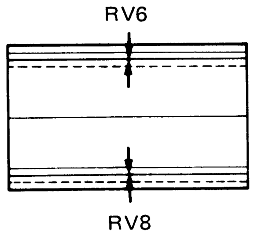


RV7

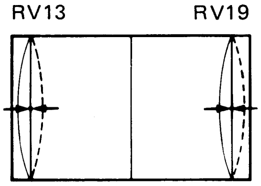


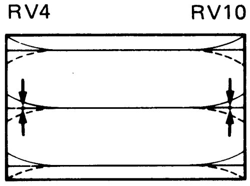
4. Adjust RGB at the top and bottom (on Y axis) of the center of the screen with RV6, RV8, RV15, RV17 respectively.



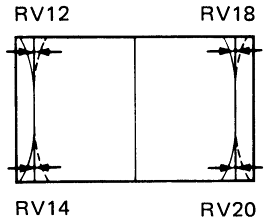


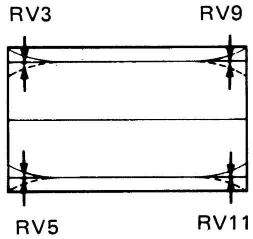
5. Adjust RGB at the left and right (on X axis) at the center of the screen with RV4, RV10 and with RV13, RV19, respectively.





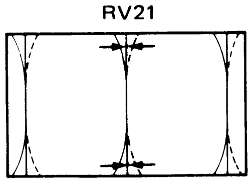
6. Adjust RGB at the corners of the screen with RV3, RV5, RV9, RV11 and with RV12, RV14, RV18, RV20 respectively.


RV12
RV18
RV14
RV20

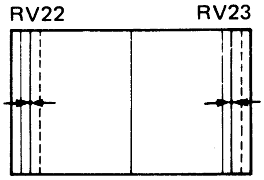

RV3
RV9
RV5
RV11

When the vertical convergence at the screen left requires further correction, adjust with V SUB CONV MIDLEFT RV18 and LEFT RV19 on the DA board. Since these variable resisters varies in small range, adjust with care.

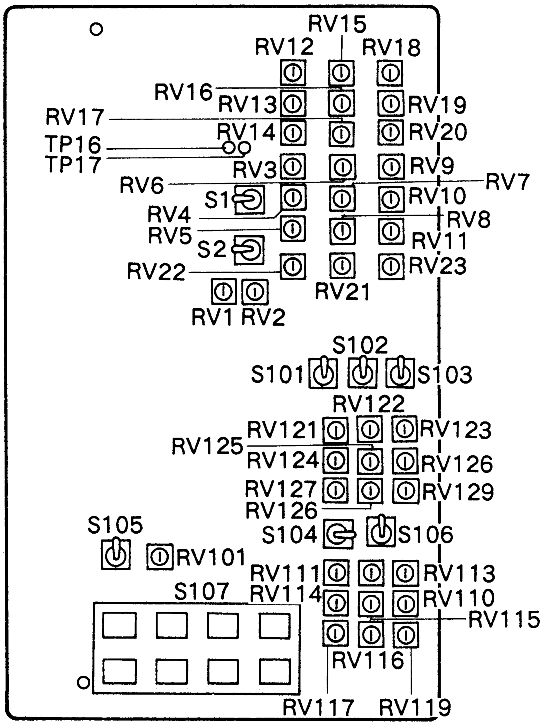
7. If not adjusted at this point, readjust starting from step 3.
8. Turn on UNDER SCAN MODE.
9. Adjust RGB at the top and bottom of the screen center with RV21. Move the top and bottom at the same time.

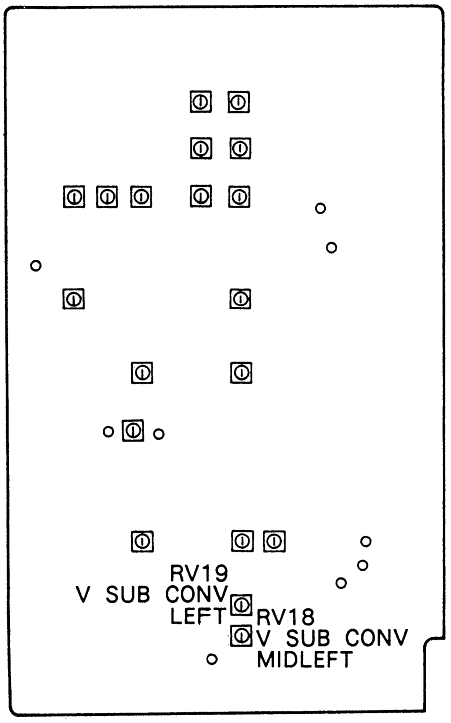


10. Adjust RGB at the left and right of the screen center with RV22 and RV23 respectively.

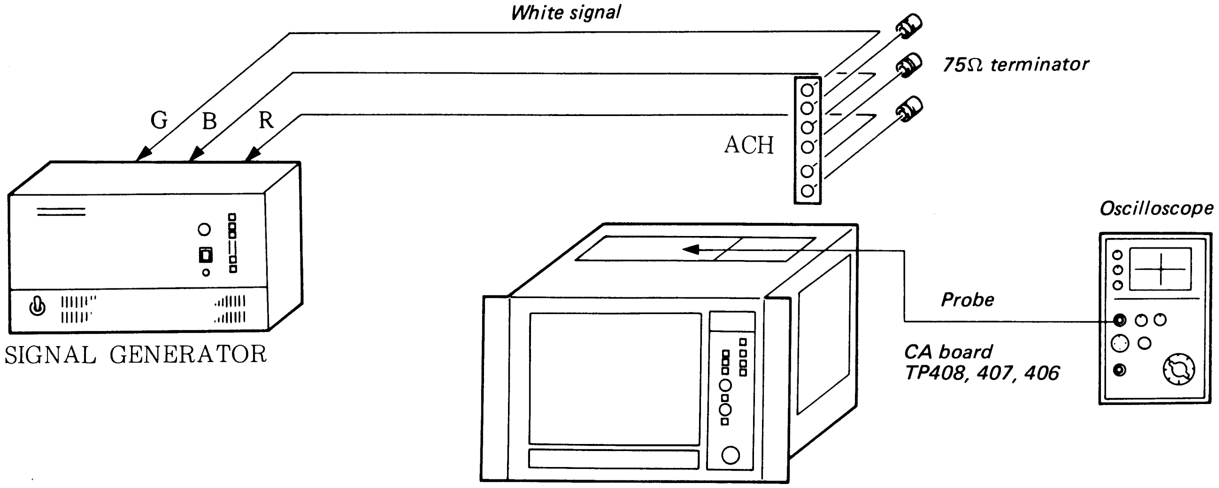


I board


RV15
RV12
RV18
RV16
RV13
RV19
RV17
RV14
RV20
TP16
TP17
RV3
RV9
RV6
S1
RV10
RV7
RV4
RV8
RV5
S2
RV11
RV22
RV23
RV21
RV1 RV2
S102
S101
S103
RV122
RV121
RV123
RV125
RV124
RV126
RV127
RV129
RV126
S105
S104
S106
RV101
RV111
RV113
S107
RV114
RV110
RV115
RV116
RV117
RV119


RV19
V SUB CONV
LEFT
RV18
V SUB CONV
MIDLEFT

[White balance adjustment]



[White balance (PRESET) adjustment]

1. Set CONTRAST MANUAL SW and BRIGHTNESS MANUAL SW on the front panel to PRESET.

   Note: Check if the preset VR (RV101, 103) of CONTRAST and BRIGHT on the JA board are at center.

2. Set ACJ/NORMAL (SW104) to ADJ, turn on all SCREEN (SW1, 2, 3) PRESET/MANUAL (SW106) to PRESET, and set INPUT/TEST (SW6), to TEST, TEST SIGNAL SELECT (SW107) to SET UP on the subcontrol panel (I board).
3. Position all BIAS VR (RV114 to 119, 124 to 129) on the I board to center.
4. Turn clockwise all GAIN VR (RV111 to 113, 121 to 123) on the I board.
5. Connect a probe to GIR (TP408) on the C_A board and adjust G1 voltage for RED to – 60V with RV902.

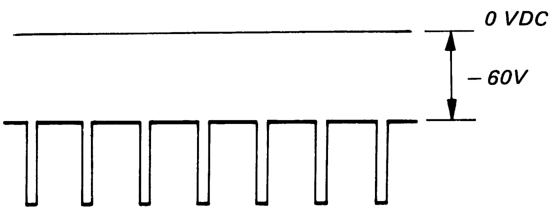


Fig. 1-13.

6. Likewise adjust the G1 voltage for GREEN (TP407), BLUE (TP406) to -60V with RV802, 702.
7. Light slightly the brightest color with G2 (SCREEN) VR. (Fig. 1-7)

   Note: Paint-lock VR after G2 (SCREEN) adjustment.

8. Using BKG VR (RV702, 802, 902) and screen VR on the C_A boards for the other two colors that were not illuminated first and the screen VR, adjust the setup brightness and color temperature as follows.

   Make fine adjustment with fine adjust BIAS VR (RV117 to 119) on the subcontrol panel (I board).
   - Brightness : 0.5NIT
   - Color temperature : 6500 °K

9. Set SIGNAL SELECT (SW107) on the I board to INPUT. Input a signal flat field. (VIDEO part: 0.7Vp-p)
10. If the highlight brightness and brightness does not increase, increase brightness as much as possible with GAIN VR (RV111 to 113) to get white balance.

    Then adjust CONTROL PRESET VR brightness.

    Adjust color tenperature as follows.
    - Brightness : 137NIT
    - Color temperature : 6500 °K

11. Set ADJ/NORMAL (SW4) to ADJ SIGNAL SELECT (SW7) to SET UP on the I board.

11. Set BIAS 1st/2nd (SW4) to 1st, INPUT/TEST (SW6) to TEST, TEST SIGNAL SELECT (SW7) to SET UP on the I board.
12. Verify if the setup white balance is satisfactory.
13. Set on ADJ/NORMAL (SW104) to NORMAL on the I board.
14. Using BIAS VR (RV701, 801, 901) on the C_A board, adjust the setup brightness and color temperature as follows.

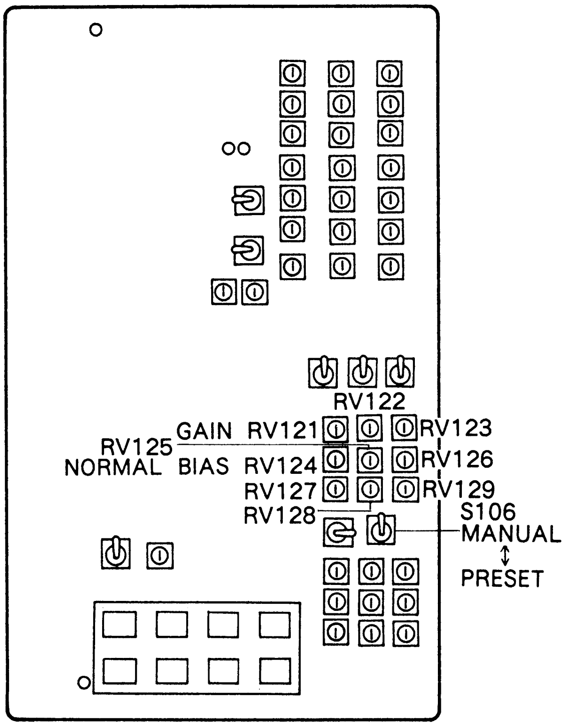
    Make fine adjustment with fine adjust BIAS VR (RV114 to 116)on the I board.
    - Brightness: 0.5NIT
    - Color temperature: 6500°K

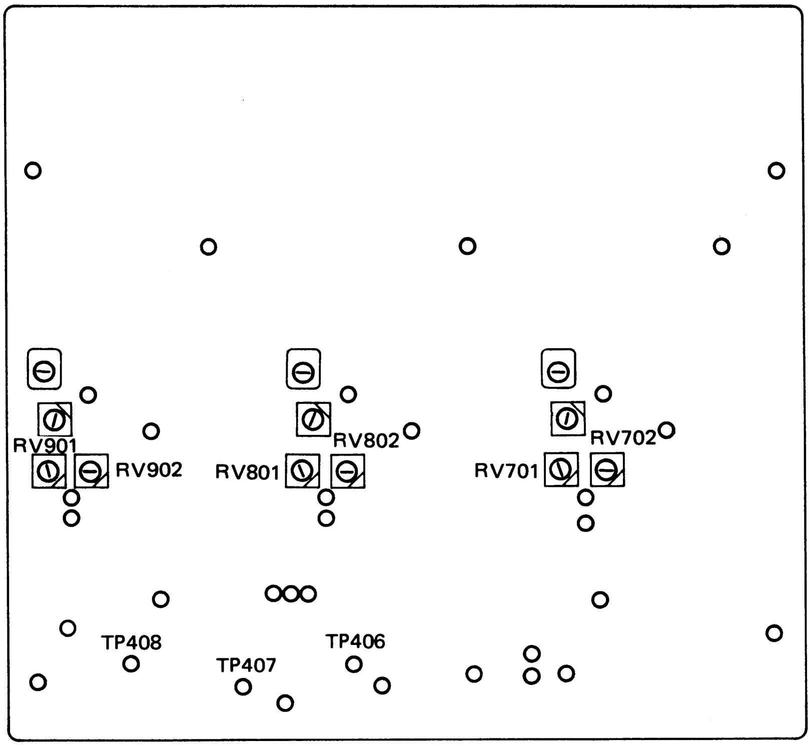
15. Set SIGNAL SELECT (SW107) on the I board to INPUT. Input a signal flat field. Check if the highlight of white balance is good.
16. If white balance is not satisfactry, repeat steps 8 through 15.

[White balance (MANUAL) adjustment]

1. Set PRESET/MANUAL (SW106) on the sub-control panel (I board) to MANUAL position.
2. Adjust the white balance (MANUAL) in the same way as the white balance (PRESET) adjustment in step 8 and later. However, use the following adjusting VRs. The VRs on the CA board are not used.

ADJ BIAS VR... RV127 to RV129
ADJ GAIN VR... RV121 to RV123
(When FLAT FIELD)
NORMAL BIAS VR... RV124 to RV126


RV122
GAIN RV121
RV123
RV125
NORMAL BIAS RV124
RV126
RV127
RV129
RV128
S106
MANUAL
↕
PRESET


RV901
RV902
RV801
RV802
RV701
RV702
TP408
TP407
TP406

CA board

4-6. SAFETY RELATED ADJUSTMENTS

High voltage adjustment

High voltage adjustment is required when the high voltage block, D40, R114, R115, R116, or RV2 is replaced. Be sure to use a high voltage meter.

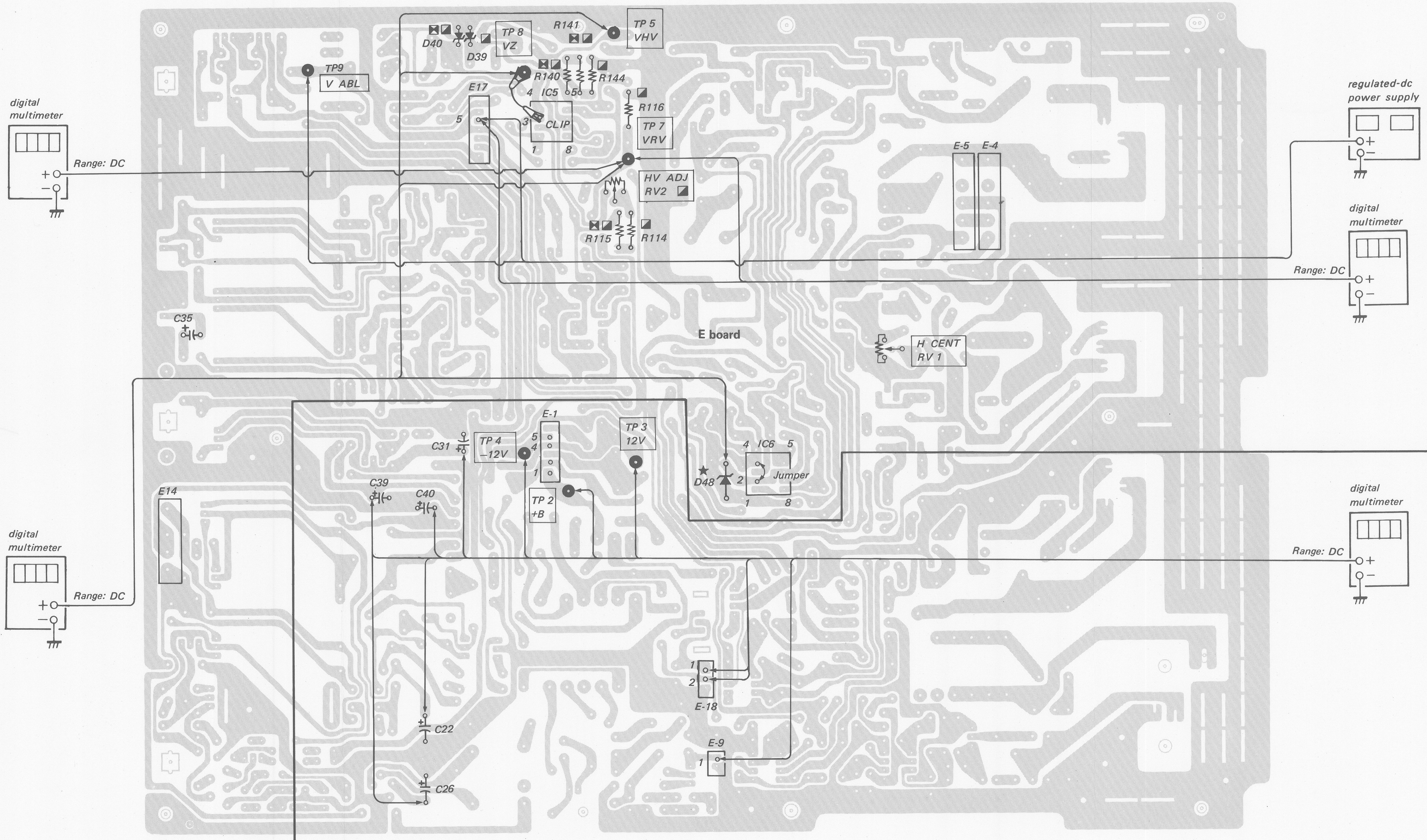
1. *Receive a white signal and set VR to preset status.*
2. *Connect the high voltage meter to the anode cap.*
3. *Adjust the voltage to HV = 25KV ± 0.2KV with VRV (RV2).*
4. *Switch the signal between black and white and verify if the voltage is below 25 ± 0.05KV.*

Note: *If no high voltage meter is available, adjust the voltage at TP7 to 8.33 ± 0.05V with RV2. Moreover, verify if there is no screen size variation by switching the signal between black and white.*

Checks at high voltage circuit part replacement

Make sure the conditions at right are met when the following parts are replaced:

D40 μPC574J, JG, HZT33-02 ◪⊠ R114 22K ± 1% ◪ △ R115 Adjusting resistor ◪ ⊠ R116 10K ± 1% ◪ RV2 2K ± 10% Metal gray scale ◪	TP8 (D40) 32.2 ± 1.2V TP7 (VRV) volume control 9.07V or less at maximum. Must be adjusted to TP7 (VRV) 8.33 ± 0.1V
R140 22K ± 1% ◪ ⊠ △ R141 Adjusting resistor ◪ ⊠ R144 10K ± 1% ◪ D39 μPC574J, JG, HZ T3302 ◪	TP5 (VHV) 9.17 ± 0.2V
D48 RD6.2EN1, 2, 3 ★	Voltage across D48 must be 6 ± 0.5V.
Switching regulator	TP2 (+B) 115 ± 1V
HV block	High voltage protection circuit check 2
D45, R142, R143, R145, R146, IC5	High voltage protection circuit checks 3, 4, 5
D44, D54, IC6	High voltage protection circuit checks 5, 6
D43, R137, IC5	High voltage protection circuit check 7


digital multimeter
Range: DC
TP9
V ABL
D40
D39
TP 8
VZ
R141
TP 5
VHV
R140
R144
4 IC5
E17
5
3
CLIP
1
8
R116
TP 7
VRV
HV ADJ
RV2
R115
R114
regulated-dc power supply
E-5
E-4
digital multimeter
Range: DC
C35
E board
H CENT
RV 1
E-1
C31
TP 4
−12V
5
4
1
TP 3
12V
TP 2
+B
4 IC6 5
D48
2
Jumper
1
8
C39
C40
E14
digital multimeter
Range: DC
digital multimeter
Range: DC
1
2
E-18
C22
C26
E-9
1

High voltage protection circuit checks

1. *Make sure TP7 (VRV) is in the range of $8.33\,^{+0.1}_{-0.2}$ V.*
2. *Make sure pin⑤(PRT) of E-17 is 8.3 ± 0.5V.*
3. *Verify the raster does not disappear when 8.8 ± 0.1VDC is applied from outside to pin⑤(PRT) of E-17.*
4. *Verify the raster disappears when 9.5 to 9.4VDC is applied from outside to pin⑤(PRT) of E-17.*
5. *Connect pin②of IC6 to GND.*
6. *Verify the raster disappears when 8.1 to 8.2VDC is connected between TP9 and GND.*
7. *Connect pin③of IC5 to TP8. Verify the raster disappears when 5.3 to 5.4VDC is applied between TP9 and GND.*
8. *Check H. STOP.*
   - *(1) Plug off either connector E-4 or E-5 and connect power.*
   - *(2) Verify the high voltage protector operates to produce no raster.*
9. *Check V. STOP.*
   - *(1) Unplug if connector E14 and connect power.*
   - *(2) Verify the high voltage protector operates to produce no raster.*

Voltages at various sections on the E board

The following lists the voltages at various sections (with a white signal preset).

1. *Pin①(TP2 + B) of connector E1: 115 ± 1V*
2. *Pin④(TP3 12V) of connector E1: 12 ± 0.6V*
3. *Pin⑤(TP4 −12V) of connector E1: −12 ± 0.6V*
4. *(+) terminal of C22: 21 ± 1V*
5. *(−) terminal of C26: −21 ± 1V*
6. *(+) terminal of C39: 33 ± 1.5V*
7. *(−) terminal of C40: −33 ± 1.5V*
8. *(+) terminal of C31: 111 ± 3V*
9. *Pin①of connector E-18: 15 ± 0.6V*
10. *Pin②of connector E-18: 9 ± 0.6V*
11. *Pin①of connector E-9: -131 ± 9V*

4-7. CIRCUIT ADJUSTMENTS

Connection and SW setting for board adjustment

Unless otherwise specified, the connection and the SW setting shall be preset as follows in the adjustments to be described on the subsequent pages.

Front panel

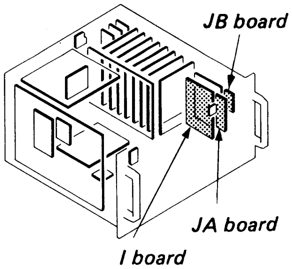
POWER SW ... ON
INPUT SW ... A
SYNC SW ... INT
MODE SW .. COLOR
SCAN MODE SW ▣ (UNDER SCAN) . . . OFF
▣ (H DELAY SW) ···OFF
▣ (V DELAY SW) ···OFF
CONTRAST MANUAL SW ... OFF
BRIGHTNESS MANUAL SW ... OFF

Drawer

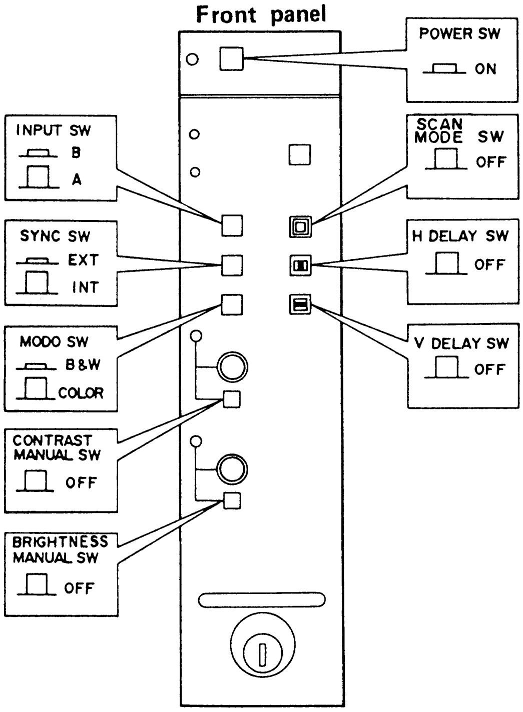
I board
SCREEN SW (SW101) ...RED ON
SCREEN SW (SW102) ...GREEN ON
SCREEN SW (SW103) ...BLUE ON
ADJ/NORMAL SW (SW104) ...NORMAL
MANUAL/PRESET SW (SW106) ...PRESET
(when using an external signal)
SIGNAL SELECT (SW107) ...HATCH
INPUT A SW (SW102) ...GBR
INPUT B SW (SW101) ...GBR
COLORR TEMP (SW106) ...PRESET

JA board
INPUT A SW(SW102) ···RGB
INPUT B SW(SW101) ···RGB

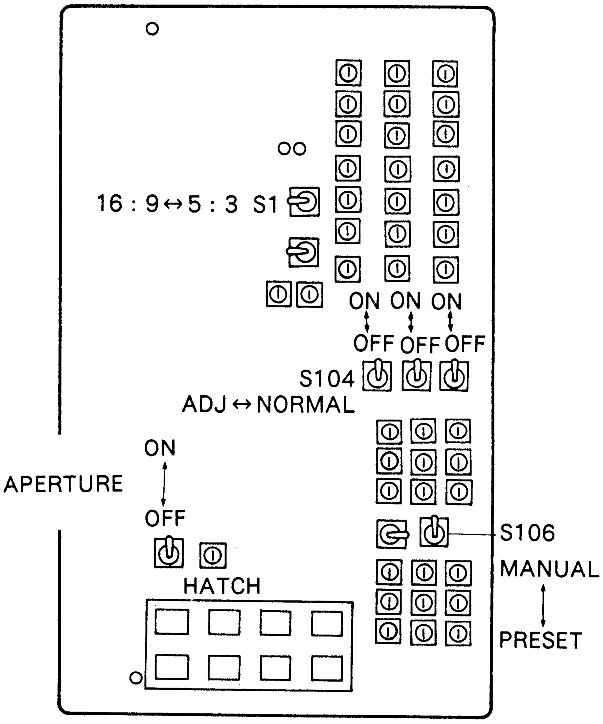
JB board
TALLY SW(SW5) ···OFF


JB board
JA board
I board

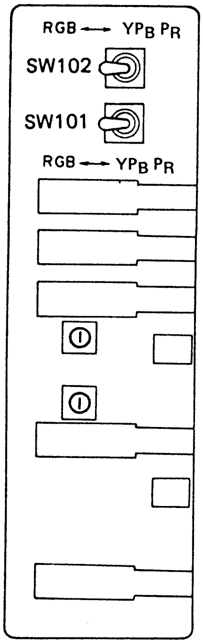
Front panel


POWER SW
ON
INPUT SW
B
A
SCAN MODE SW
OFF
SYNC SW
EXT
INT
H DELAY SW
OFF
MODO SW
B&W
COLOR
V DELAY SW
OFF
CONTRAST MANUAL SW
OFF
BRIGHTNESS MANUAL SW
OFF

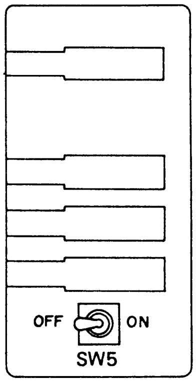
I board


16 : 9↔5 : 3 S1
ON ON ON
OFF OFF OFF
S104
ADJ↔NORMAL
APERTURE
ON
OFF
HATCH
S106
MANUAL
PRESET

JA board


RGB ⟵⟶ YPB PR
SW102
SW101
RGB ⟵⟶ YPB PR

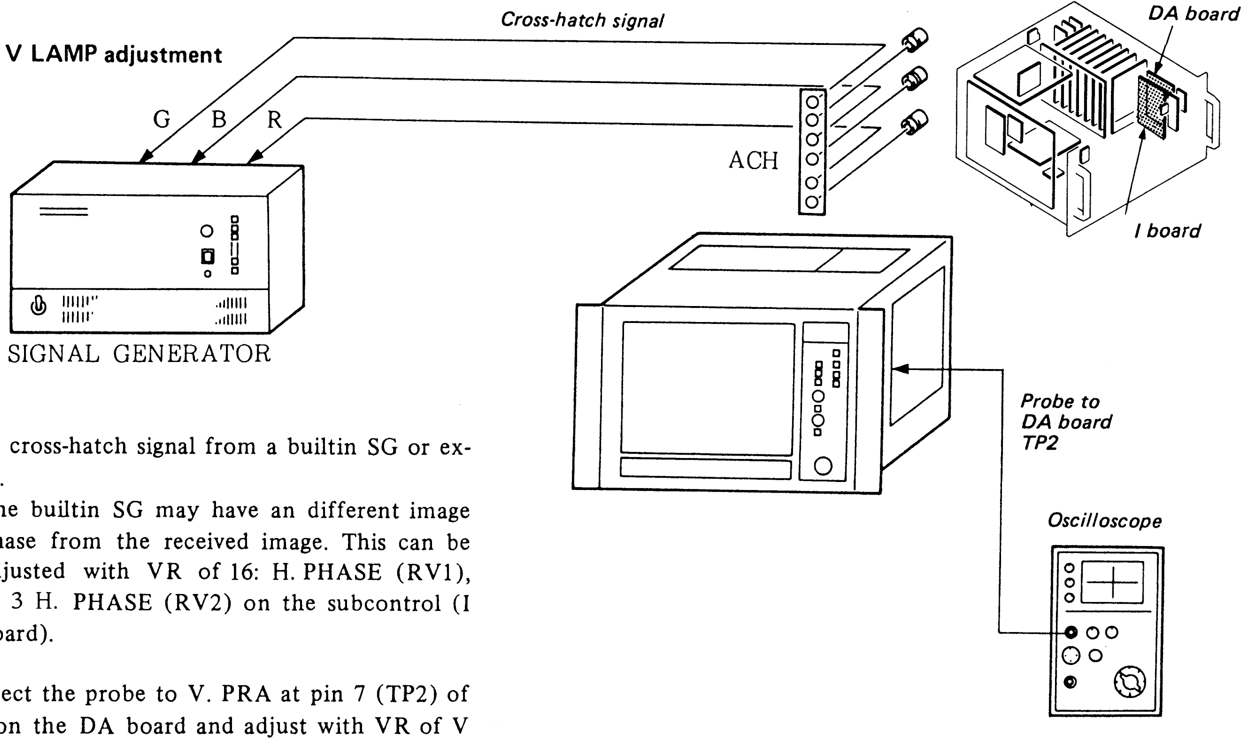
JB board



1. DA Board Adjustments

As to the vertical sub-convergence, refer to the dynamic convergence.

DA board V LAMP adjustment

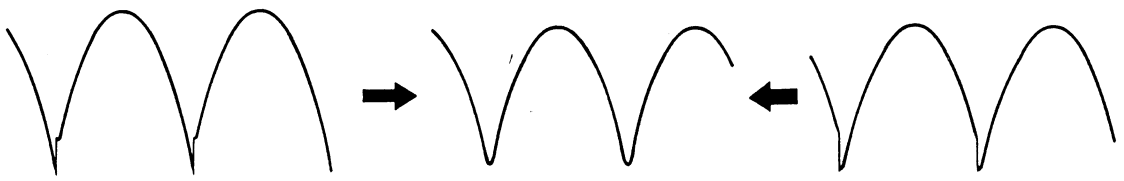

Cross-hatch signal
DA board
G
B
R
ACH
SIGNAL GENERATOR
I board
Probe to
DA board
TP2
Oscilloscope

Receive a cross-hatch signal from a builtin SG or external SG.

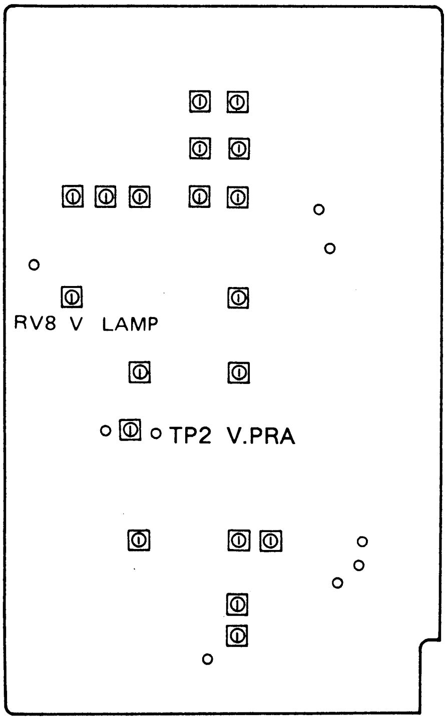
Note: The builtin SG may have an different image phase from the received image. This can be adjusted with VR of 16: H. PHASE (RV1), 5: 3 H. PHASE (RV2) on the subcontrol (I board).

1. Connect the probe to V. PRA at pin 7 (TP2) of IC6 on the DA board and adjust with VR of V LAMP (RV8) until the waveform is obtained.

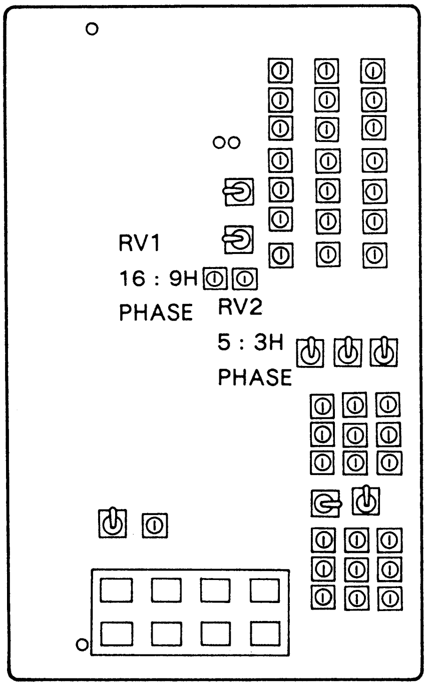
   Note: This is factory-adjusted.



DA board


RV8 V LAMP
TP2 V.PRA

I board


RV1
16 : 9H
PHASE
RV2
5 : 3H
PHASE

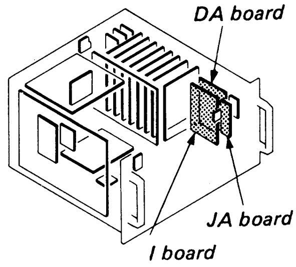
DA board image distortion adjustment

Press BRIGHTNESS MANUAL SW. (The lamp will then be turned on.)

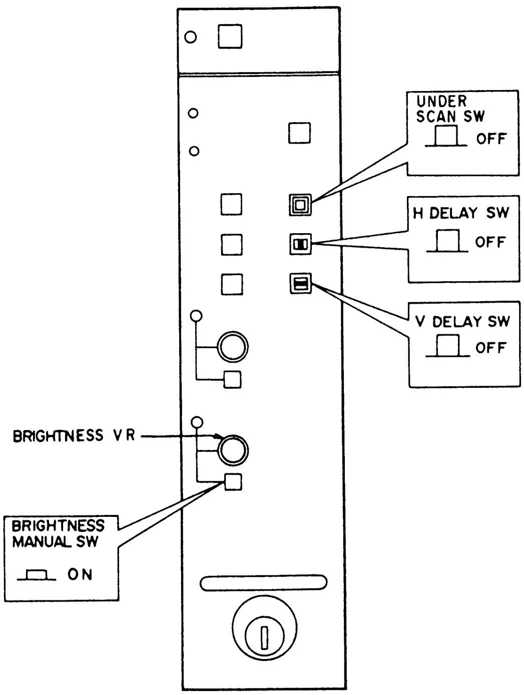
1. H CENT adjustment
   (1) Turn on BRIGHTNESS SW on the front panel (Fig. 1-2), and turn VR clockwise.
   (2) Use H. SIZE VR (RV7) on the DA board to reduce the horizontal size so that the raster will be missing at left and right.
   (3) Remove horizontal blanking with H BLK WIDTH VR (RV2).
   (4) Turn H CENT VR (RV1) on the E board until the raster-missing parts at left and right become identical. (See pages 4-7 to 4-9 for the location of E board, RV1).
2. Image phase adjustment
   (1) Use 16: 9H.PHASE (RV1), 5: 3H. PHASE (RV2) on the I board to adjust the image phase so that the image comes at the center of the raster.

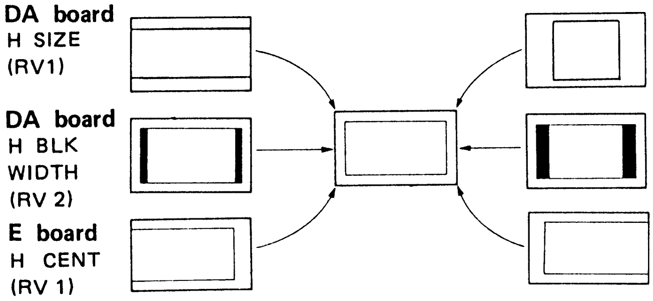
Note:

1. When 16:9, input the BTAS-001 signal to adjust. When 5:3, input the conventional Sony standard signal to adjust. When the internal signal is selected in 5:3, the screen phase deviates.
2. If the phase is different between HD, VD and EXT SYNC, see [HD and H. SYNC phase adjustment].

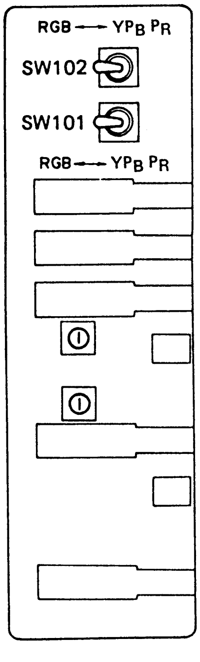

DA board
JA board
I board

Front panel

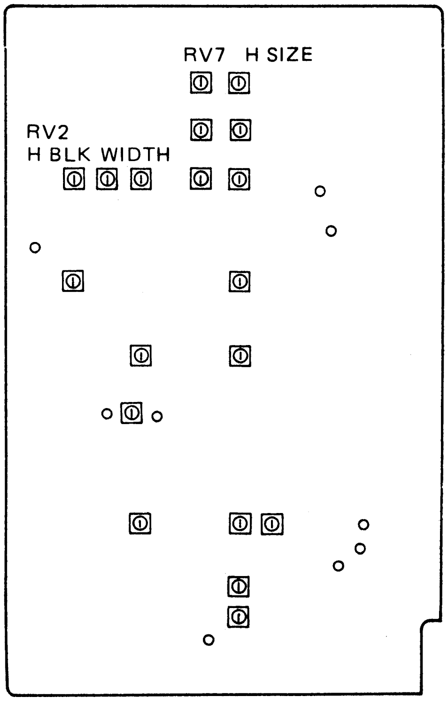

UNDER SCAN SW
OFF
H DELAY SW
OFF
V DELAY SW
OFF
BRIGHTNESS VR
BRIGHTNESS MANUAL SW
ON


DA board
H SIZE
(RV1)
DA board
H BLK
WIDTH
(RV 2)
E board
H CENT
(RV 1)

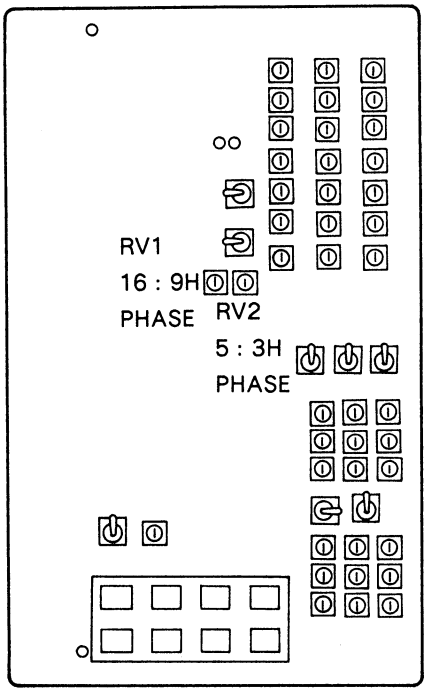
JA board


RGB ⟵ YPB PR
SW102
SW101
RGB ⟵ YPB PR

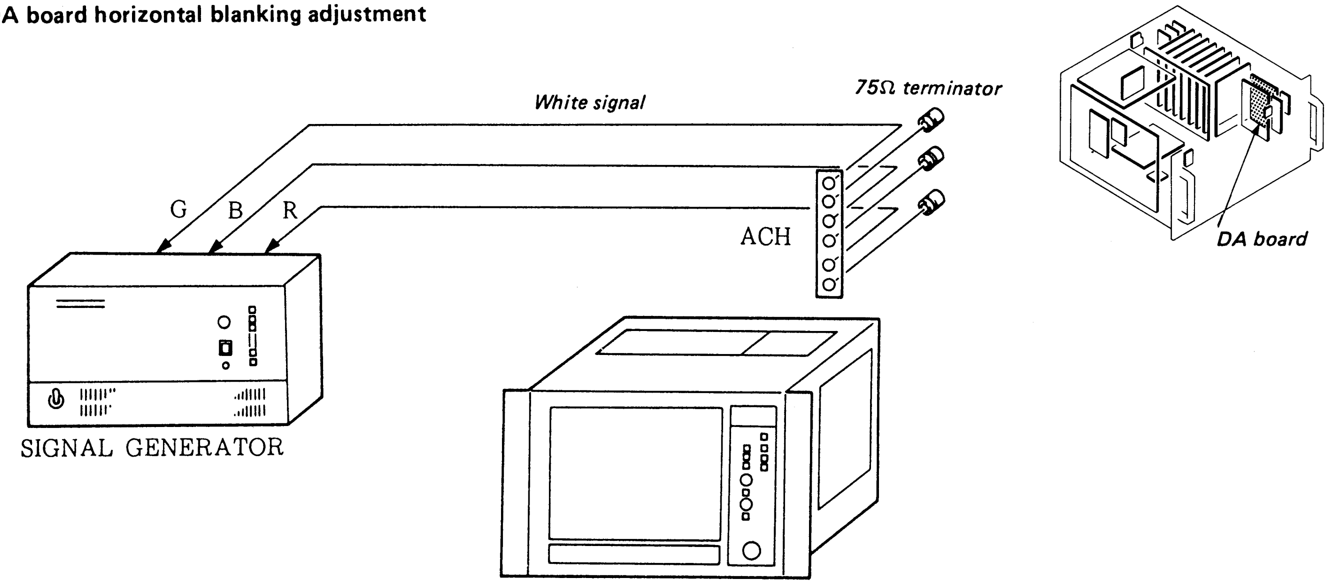
DA board


RV7 H SIZE
RV2
H BLK WIDTH

I board

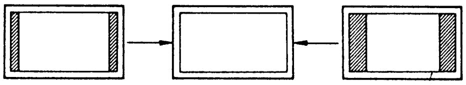

RV1
16 : 9H
PHASE
RV2
5 : 3H
PHASE

DA board horizontal blanking adjustment


White signal
75Ω terminator
G
B
R
ACH
SIGNAL GENERATOR
DA board

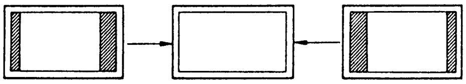
1. Receive a white signal (builtin signal).
2. By tracking with H BLK WIDTH (RV2) and H BLK PHASE (RV1) on the DA board, adjust the horizontal blanking for maximum blanking.

Adjust the horizontal blanking width.

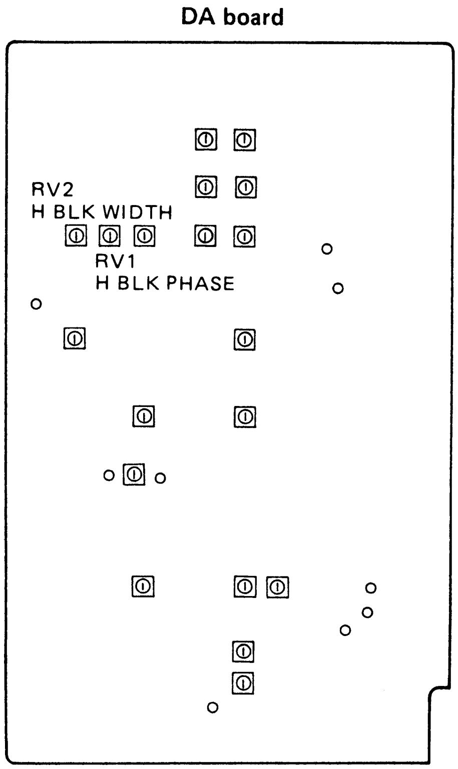


H BLANKING WIDTH (RV2)

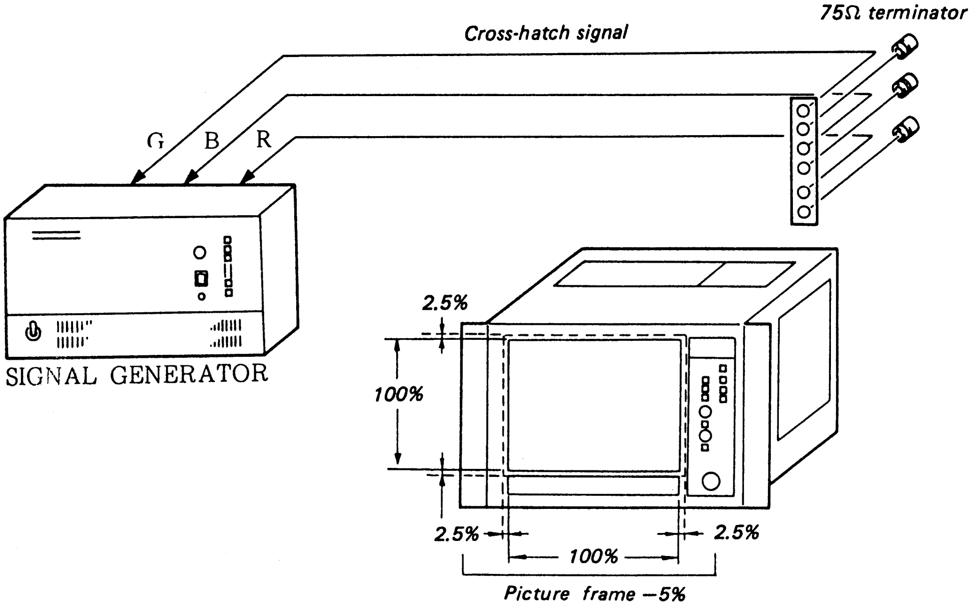
Adjust the horizontal blanking phase on both sides.

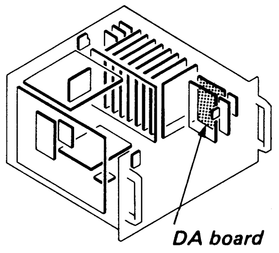


H BLANKING PHASE (RV1)

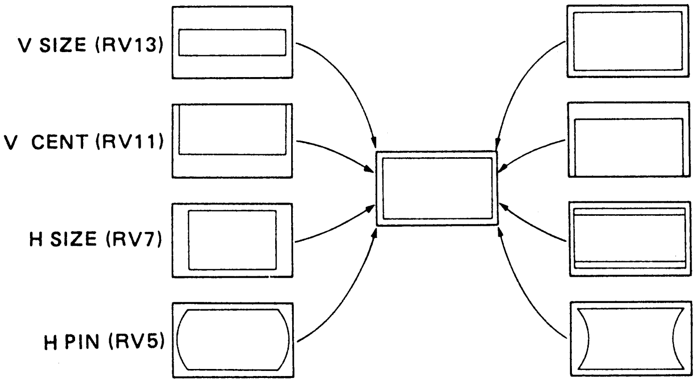

DA board
RV2
H BLK WIDTH
RV1
H BLK PHASE

DA board horizontal and vertical size adjustment

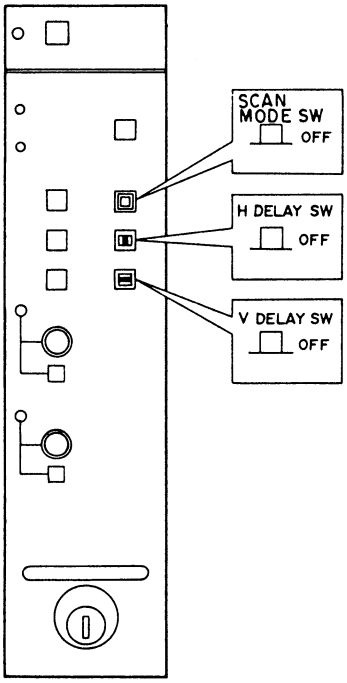

Cross-hatch signal
75Ω terminator
G
B
R
SIGNAL GENERATOR
2.5%
100%
2.5%
100%
2.5%
Picture frame −5%



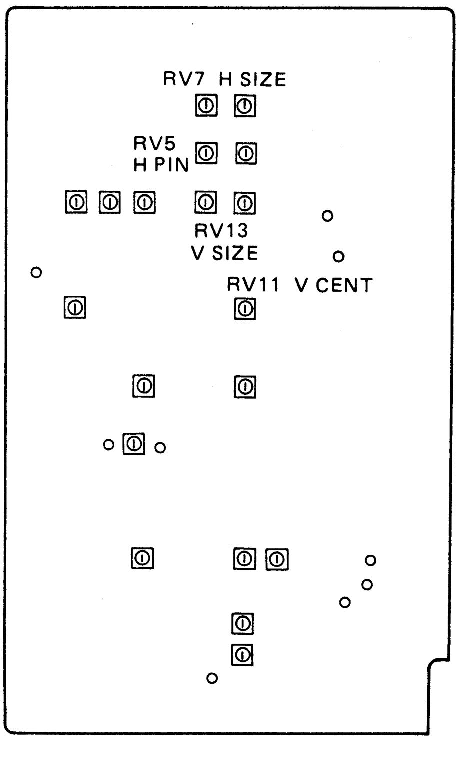
1. Give a cross-hatch signal (builtin signal).
2. Set SCAN MODE SW on the front panel to NORMAL.
3. Reduce slightly the V size with V SIZE (RV13) on the DA board and adjust V CENT (RV11). Regain V SIZE.
4. Adjust for 5% over-scan of picture frame with NORMAL H SIZE (RV7), H PIN (RV5), V SIZE (RV13).


V SIZE (RV13)
V CENT (RV11)
H SIZE (RV7)
H PIN (RV5)

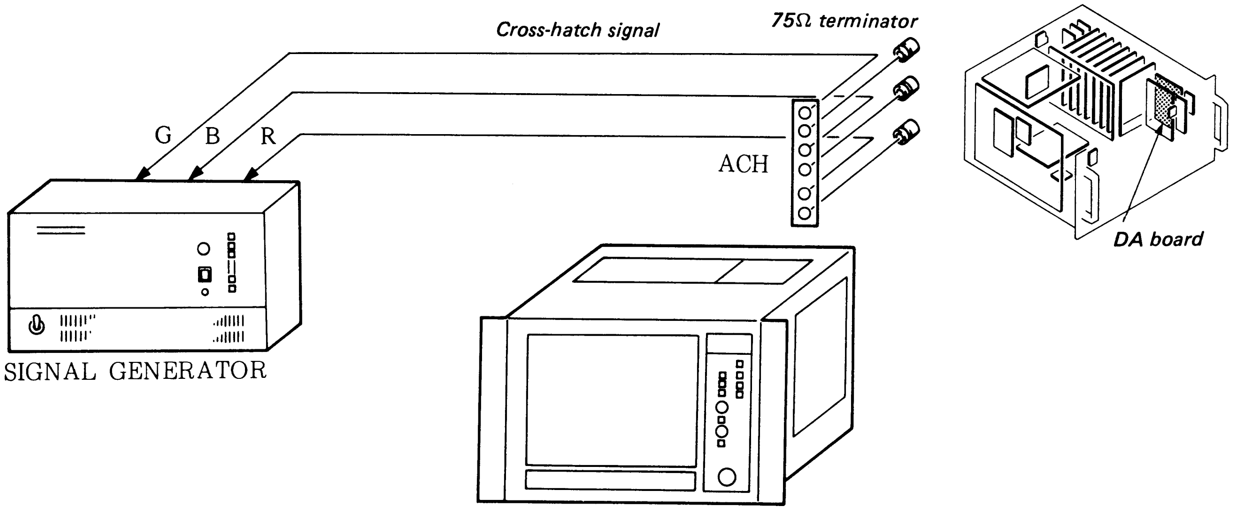
Front panel


SCAN MODE SW
OFF
H DELAY SW
OFF
V DELAY SW
OFF

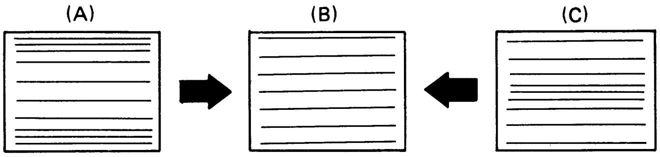
DA board


RV7 H SIZE
RV5
H PIN
RV13
V SIZE
RV11 V CENT

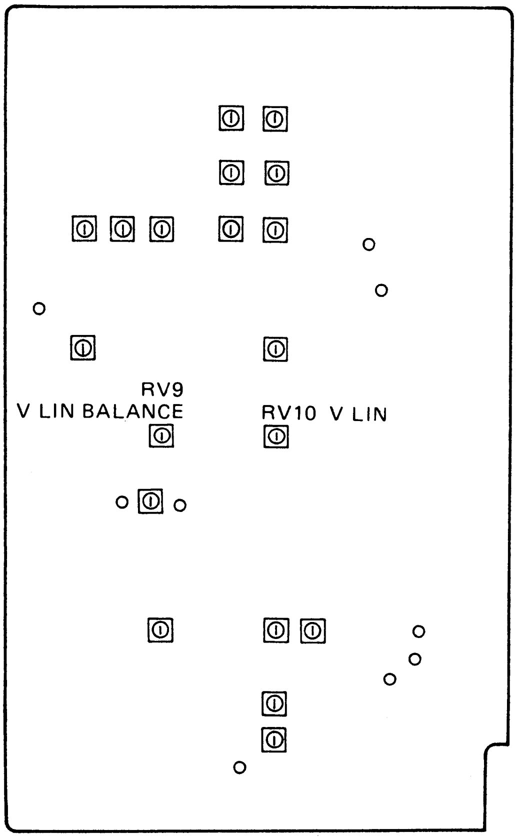
DA board vertical linearity adjustment


Cross-hatch signal
75Ω terminator
G
B
R
ACH
DA board
SIGNAL GENERATOR

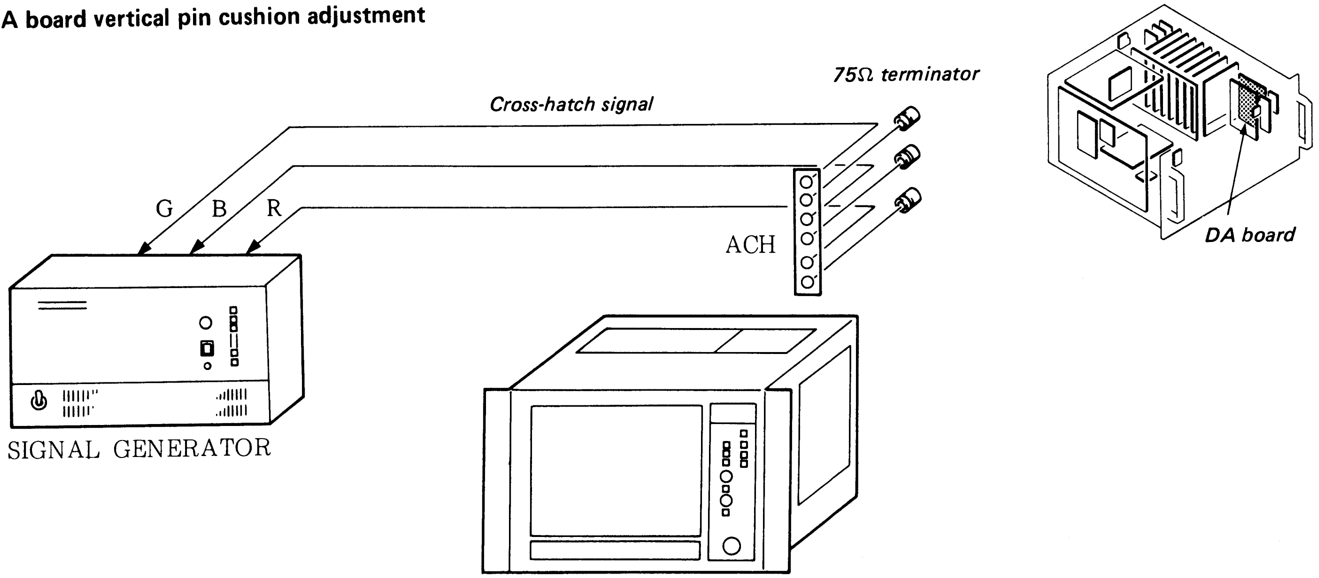
1. Input a cross-hatch signal (builtin or external signal).
2. Turn fully clockwise V LIN (RV10) on the DA board as in (A).
3. Using V LINE BALANCE (RV9), adjust until the top and bottom become symmetric as in (B).
4. Adjust the linearity with L LIN (RV10) until the whole is evenly spaced as in (C).



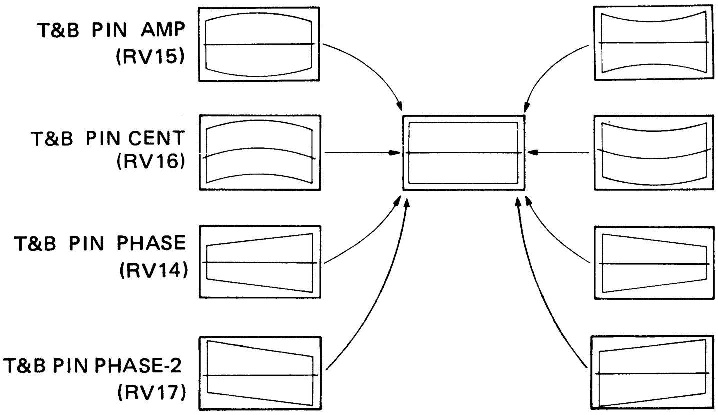
DA board


RV9
V LIN BALANCE
RV10 V LIN

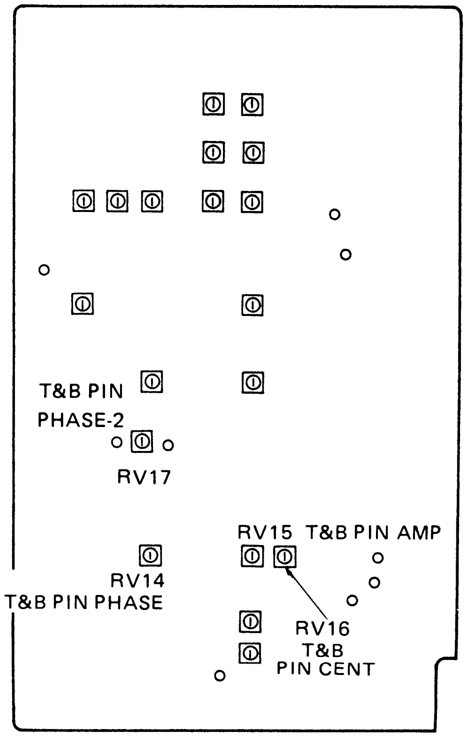
DA board vertical pin cushion adjustment


75Ω terminator
Cross-hatch signal
G
B
R
ACH
SIGNAL GENERATOR
DA board

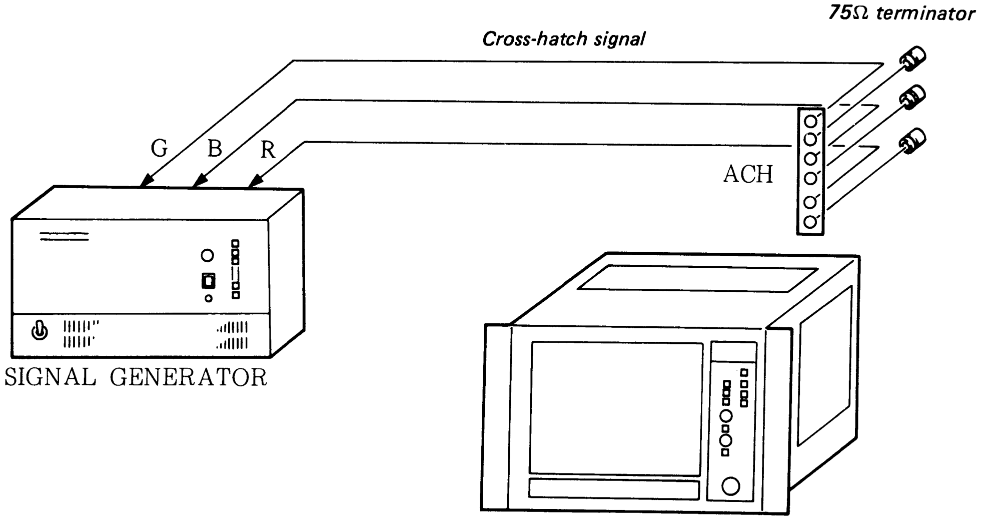
1. Input a cross-hatch signal (builtin or external signal).
2. Adjust the vertical pincushion by tracking T&B PIN AMP (RV15), T&B PIN CENT (RV16), T&B PIN PHASE (RV14), and T&B PIN PHASE-2 (RV17).

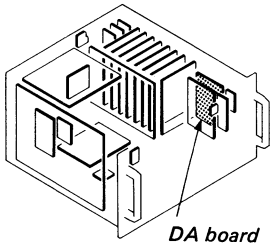

T&B PIN AMP
(RV15)
T&B PIN CENT
(RV16)
T&B PIN PHASE
(RV14)
T&B PIN PHASE-2
(RV17)

DA board

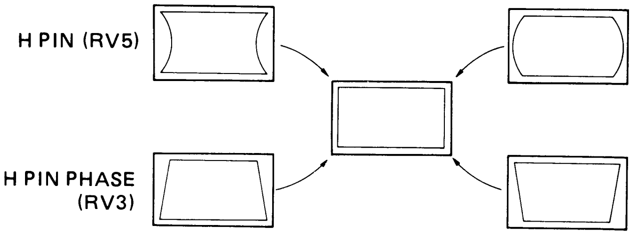

T&B PIN
PHASE-2
RV17
RV15 T&B PIN AMP
RV14
T&B PIN PHASE
RV16
T&B
PIN CENT

DA board horizontal pincushion adjustment

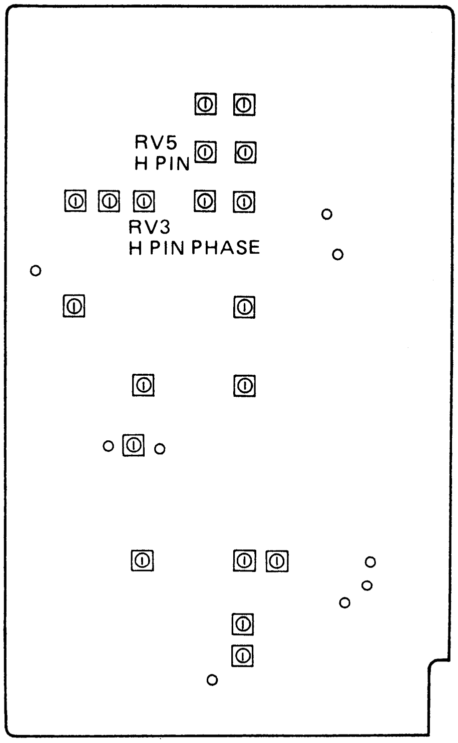

Cross-hatch signal
75Ω terminator
G
B
R
ACH
SIGNAL GENERATOR



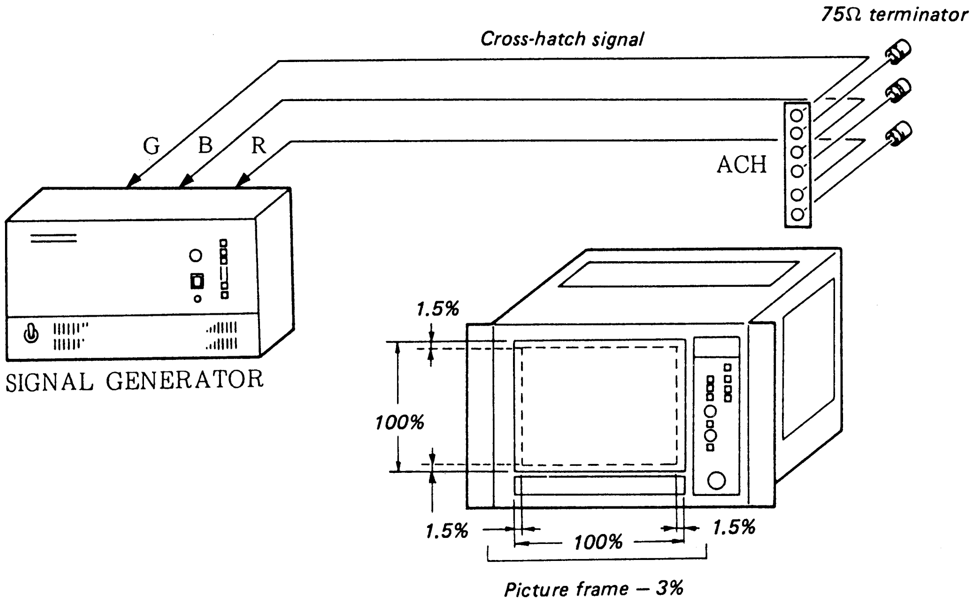
1. Input a cross-hatch signal (builtin or external signal).
2. Adjust the horizontal pincushion with H PIN (RV5), H PIN PHASE (RV3).

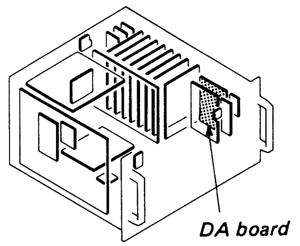

H PIN (RV5)
H PIN PHASE (RV3)

DA board

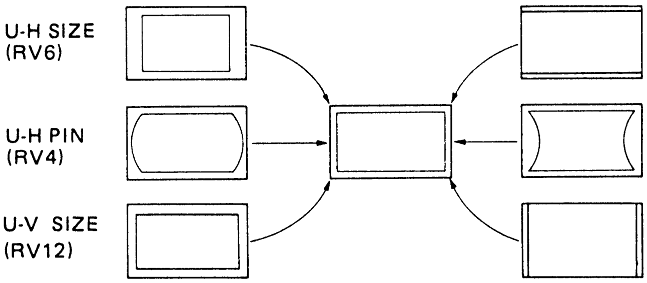

RV5
H PIN
RV3
H PIN PHASE

DA board underscan adjustment

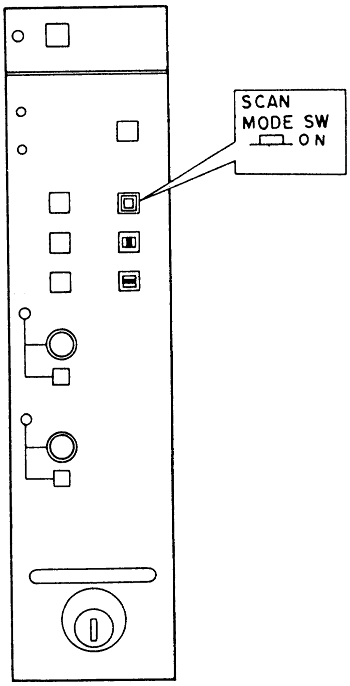

Cross-hatch signal
75Ω terminator
G
B
R
ACH
SIGNAL GENERATOR
1.5%
100%
1.5%
1.5%
100%
1.5%
Picture frame – 3%



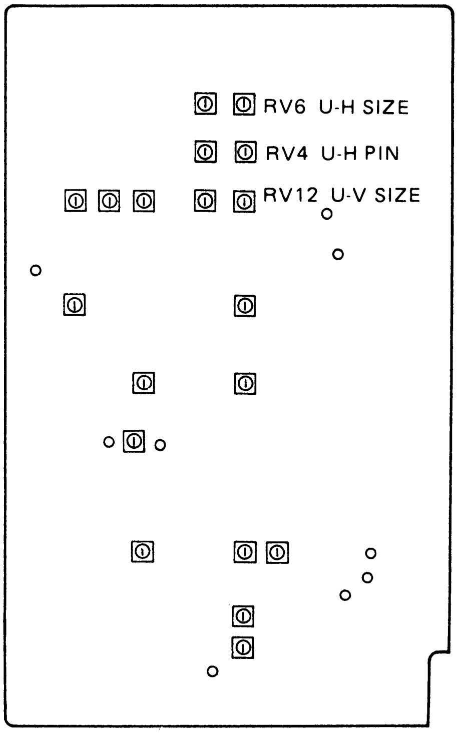
1. Input a cross-hatch signal (builtin signal).
   (However, use the composite G signal only in this adjustment.)
2. Turn on SCAN MODE SW (UNDER SCAN SW ▣) on the front panel.
3. By tracking the underscan U-H. SIZE (RV6), U-H. PIN (RV4), U-V. SIZE (RV12), adjust until 3% underscan of picture frame is obtained.


U-H SIZE
(RV6)
U-H PIN
(RV4)
U-V SIZE
(RV12)

Front panel

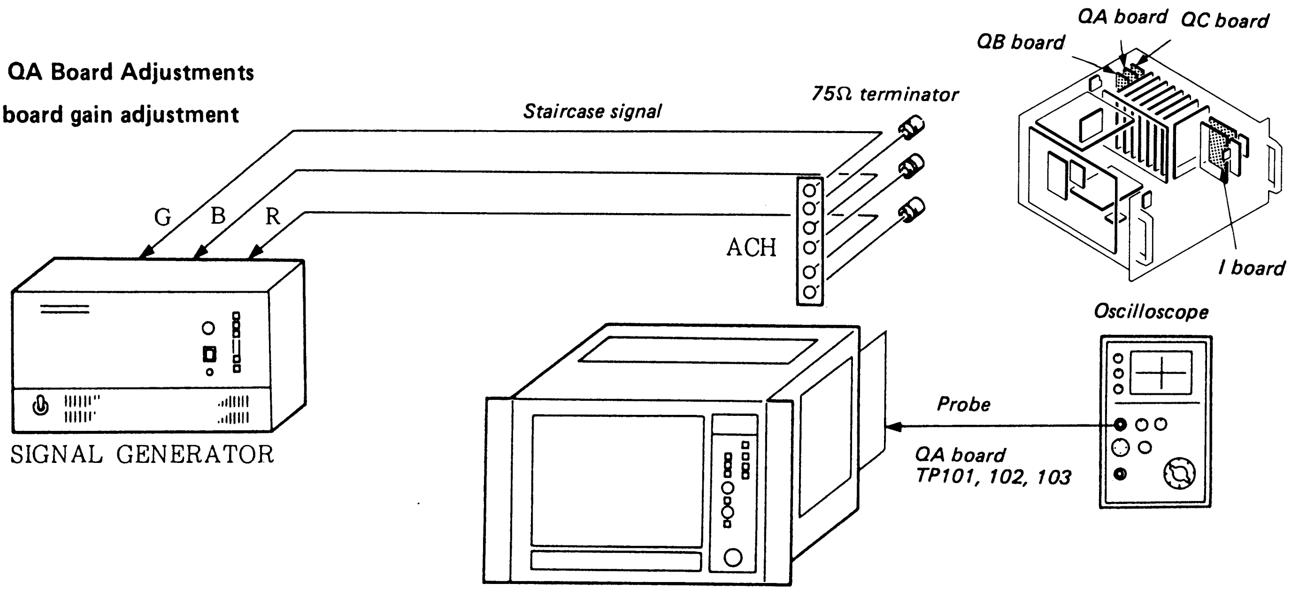

SCAN
MODE SW
ON

DA board

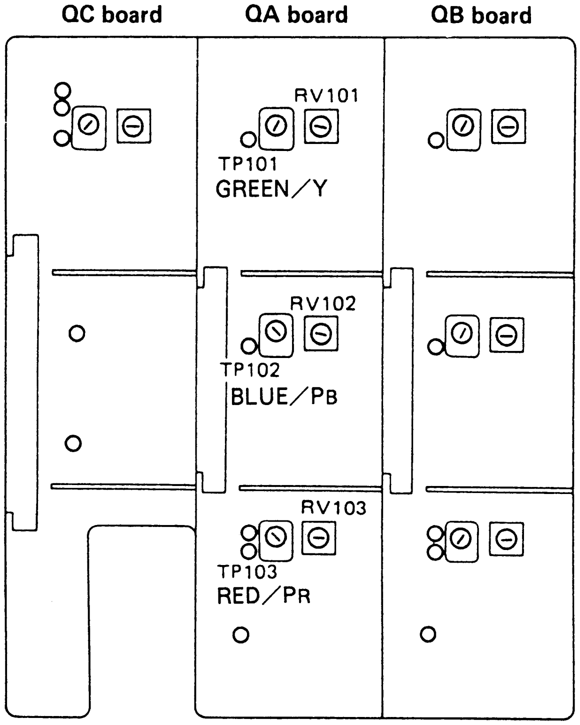

RV6 U-H SIZE
RV4 U-H PIN
RV12 U-V SIZE

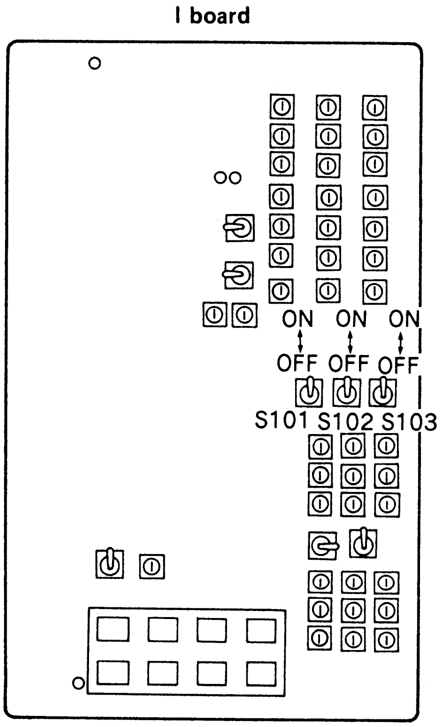
2. QA Board Adjustments

QA board gain adjustment

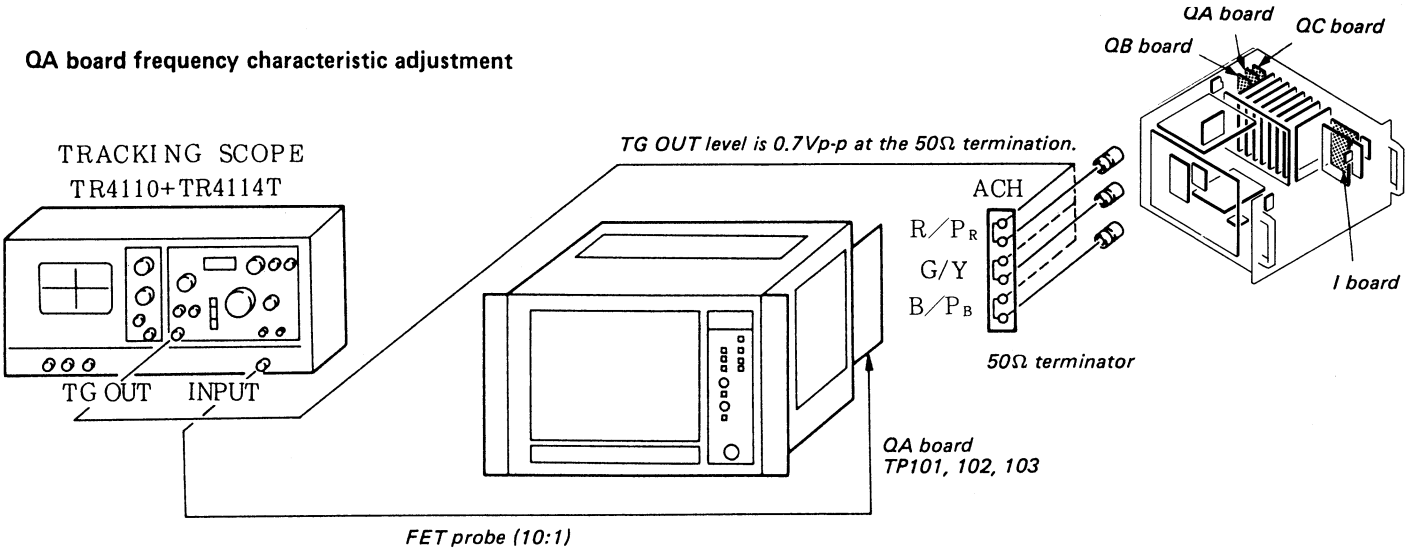

QA board
QC board
QB board
75Ω terminator
Staircase signal
G
B
R
ACH
I board
Oscilloscope
Probe
QA board
TP101, 102, 103
SIGNAL GENERATOR

1. Input a staircase signal.
2. Turn off all of RED (SW1), GREEN (SW2), and BLUE (SW3) on the subcontrol panel (I board).
3. Using RV101, 102, and 103, adjust to 0.7 ± 0.01Vp-p the level of the video signal portion (not including the sync pulse portion) of RED/P_R (TP101), GREEN/Y (TP102), and BLUE/P_B (TP103)on the QA board.


QC board
QA board
QB board
RV101
TP101
GREEN/Y
RV102
TP102
BLUE/PB
RV103
TP103
RED/PR


I board
ON
OFF
ON
OFF
ON
OFF
S101
S102
S103

QA board frequency characteristic adjustment


QA board
QC board
QB board
I board
TRACKING SCOPE
TR4110+TR4114T
TG OUT
INPUT
TG OUT level is 0.7Vp-p at the 50Ω termination.
ACH
R/PR
G/Y
B/PB
50Ω terminator
QA board
TP101, 102, 103
FET probe (10:1)

1. Turn off all of RED (SW1), GREEN (SW2), and BLUE (SW3) on the subcontrol panel (I board).
2. Using CV101, adjust the frequency characteristic at RED/P_R (TP101) to ±0.5dB over the range of 60Hz to 30MHz. Input the tracking generator output to the RED/P_R terminal.
3. Using CV102, adjust the frequency characteristic at GREEN/Y (TP102) to ±0.5dB over the range of 60Hz to 30MHz. Input the tracking generator output to the GREEN/Y terminal.
4. Using CV103, adjust the frequency characteristic at BLUE/P_B (TP103) to ±0.5dB over the range of 60Hz to 30MHz. Input the tracking generator output to the BLUE/P_B terminal.

[QB board gain adjustment]

Input a signal to the QB board. The rest of the measurement is the same as in the QA board gain adjustment.

[QB board frequency characteristic adjustment]

Input a signal to the QB board. The rest of the measurement is the same as in the QA board frequency characteristic adjustment.

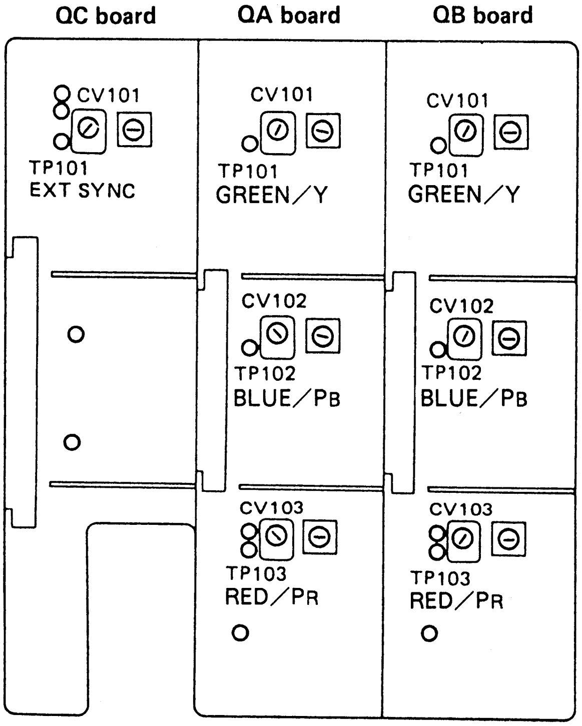
[QC board gain adjustment]

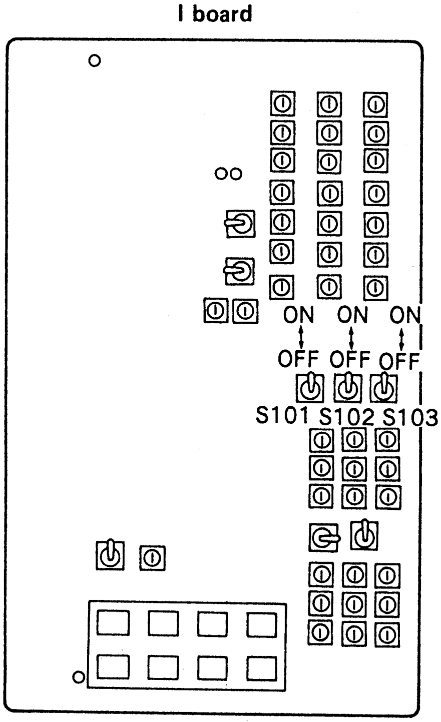
Input a signal to EXT SYNC of QC. TP101, RV101 and the rest of the measurements are the same as in the QA board gain adjustment.

[QC board frequency characteristic adjustment]

Input a signal to EXT SYNC of QC. The rest of the measurement is the same as in the QA board frequency characteristic adjustment.

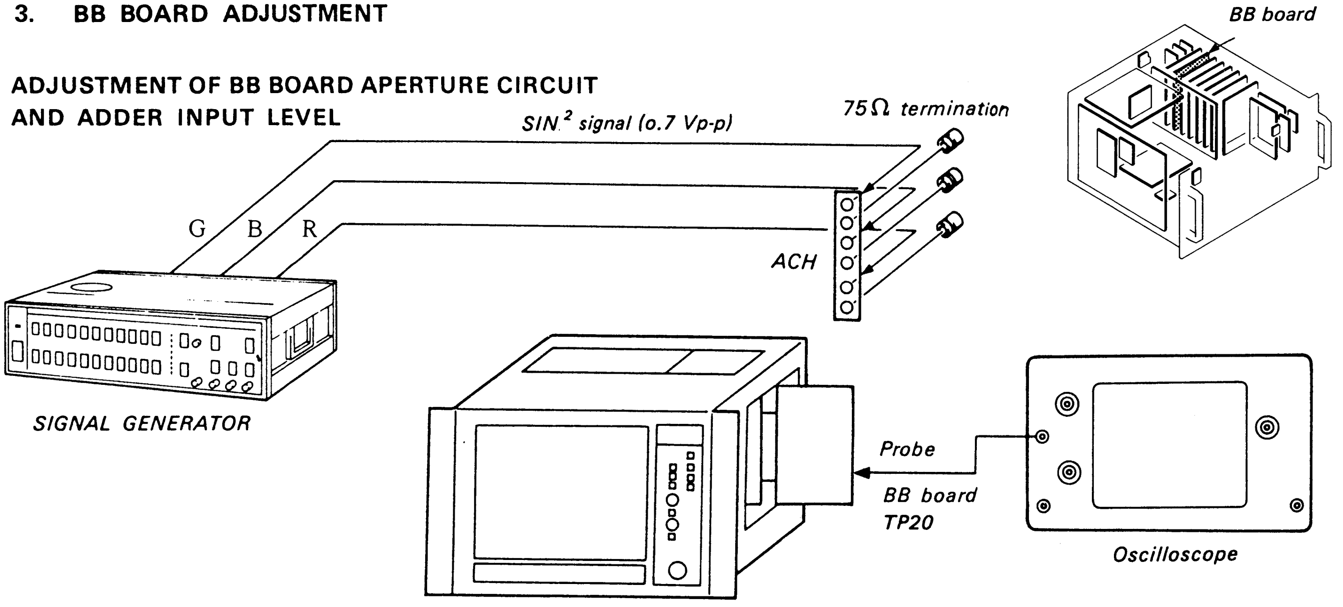
The adjustment range is ± 1dB at TP101 and RV101.


QC board
QA board
QB board
CV101
TP101
EXT SYNC
CV101
TP101
GREEN/Y
CV101
TP101
GREEN/Y
CV102
TP102
BLUE/PB
CV102
TP102
BLUE/PB
CV103
TP103
RED/PR
CV103
TP103
RED/PR

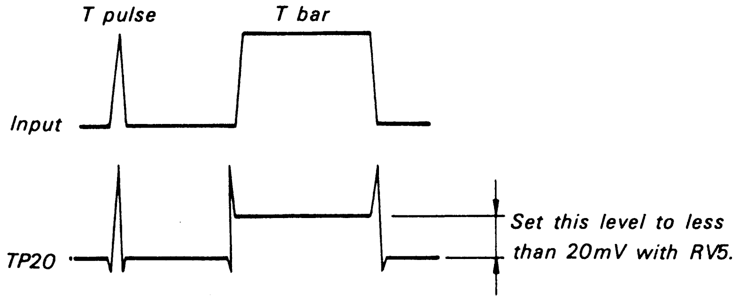

I board
ON ON ON
OFF OFF OFF
S101 S102 S103

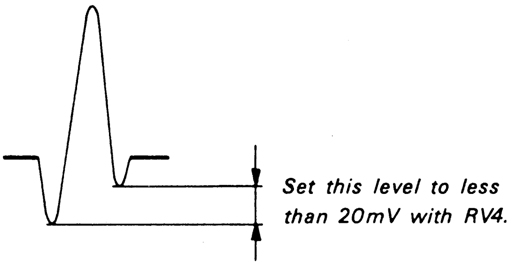
3. BB BOARD ADJUSTMENT

ADJUSTMENT OF BB BOARD APERTURE CIRCUIT AND ADDER INPUT LEVEL

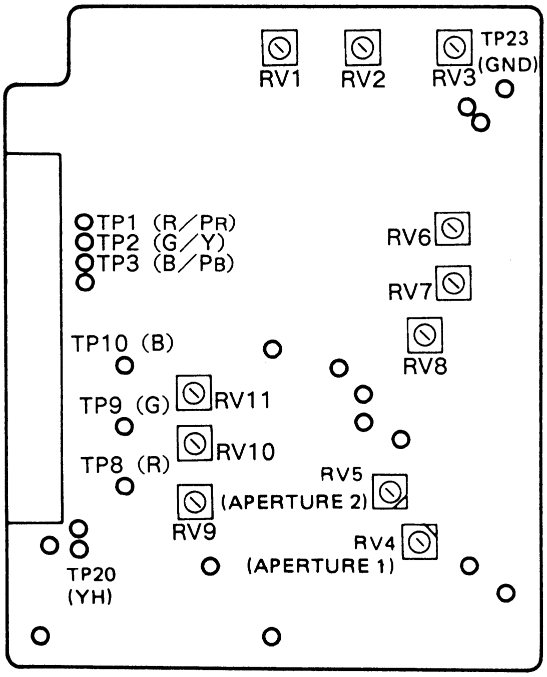

BB board
SIN^2 signal (o.7 Vp-p)
75Ω termination
G
B
R
ACH
SIGNAL GENERATOR
Probe
BB board
TP20
Oscilloscope

1. Input the SIN^2 signal.
2. Set the APERTURE SW on the I board to ON.
3. Set the APERTURE VR to maximum.
4. Cut off all RED, GREEN and BLUE on the I board.
5. Connect YH (TP20) of the BB board to an oscilloscope.
6. Adjust with RV4 and RV5 of the BB board to make the level below 20mV as shown in Fig.

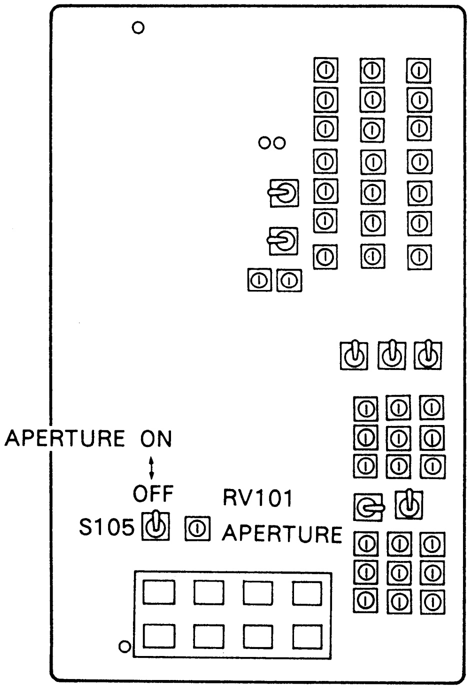

T pulse
T bar
Input
TP20
Set this level to less than 20mV with RV5.


Set this level to less than 20mV with RV4.

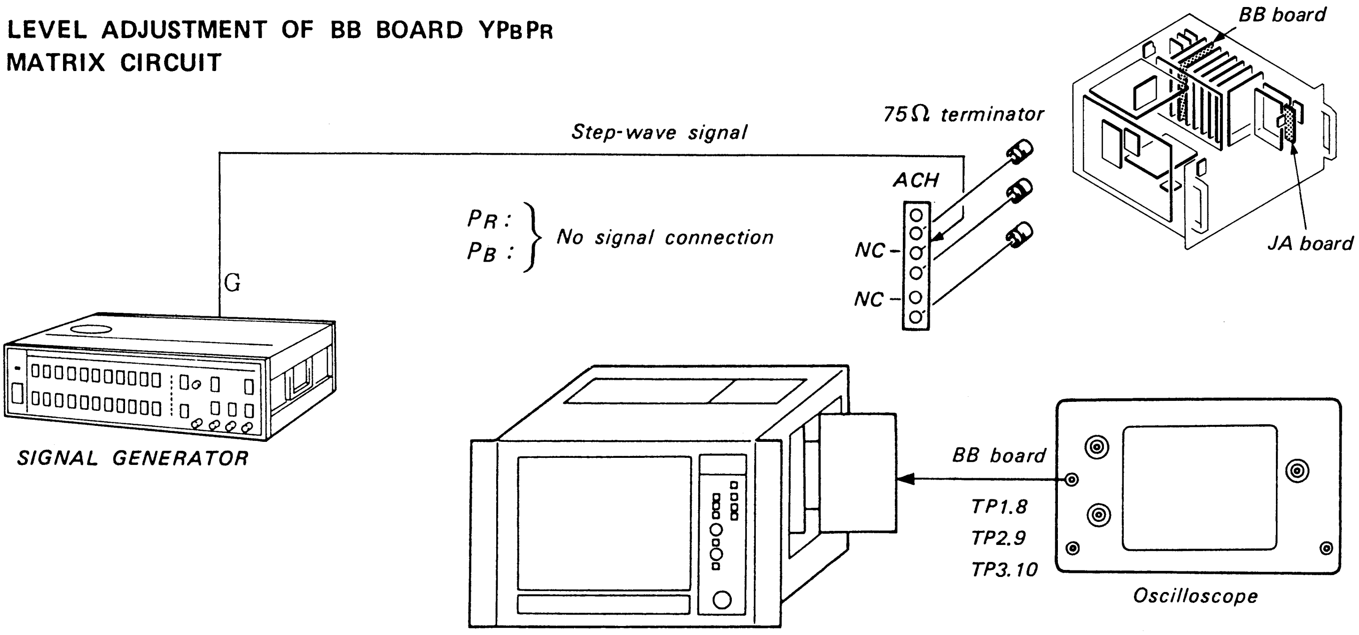
BB board


RV1
RV2
RV3
TP23
(GND)
TP1 (R/PR)
TP2 (G/Y)
TP3 (B/PB)
RV6
RV7
RV8
TP10 (B)
TP9 (G)
RV11
RV10
TP8 (R)
RV5
(APERTURE 2)
RV9
RV4
(APERTURE 1)
TP20
(YH)

I board


APERTURE ON
OFF
S105
RV101
APERTURE

LEVEL ADJUSTMENT OF BB BOARD YPBPR MATRIX CIRCUIT



[RGB and Y level adjustment]

1. Remove J1 and J2 on the BB board.
2. Set SW102 on the JA board to GBR position, and measure the VR1 amplitude at R OUT (TP8) in the RGB mode.
3. Set SW102 on the JA board to Y PB PR position, and adjust RV1 so that the amplitude at R OUT (TP8) in the Y PB PR mode is VR1±10 mVp-p.
4. Adjust G OUT and B OUT in the same manner as R OUT.
   G OUT... TP9, RV2
   B OUT... TP10, RV3
5. Change the position of SW102 on the JA board, and confirm that there are no color difference on the screen in the RGB mode and Y PB PR mode. If not, readjust from step 3.
6. Plug J1 and J2 their original positions.

[RGB and B&W level adjustment]

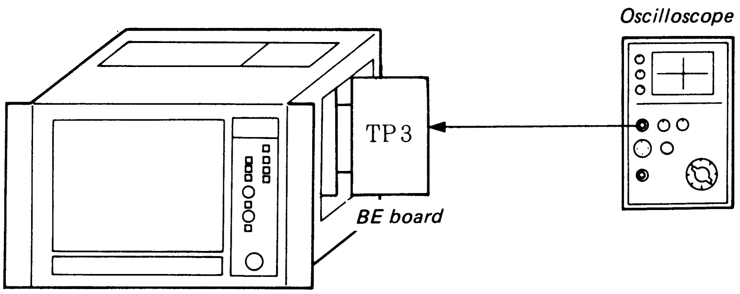
7. Set SW102 on the JA board to RGB position.
8. Set the MODE select switch (COLOR/B&W) on the front panel to B&W position, and measure the VR2 amplitude at R OUT (TP8) in the B&W mode.
9. Set the MODE select switch (COLOR/B&W) on the front panel to COLOR position, and adjust RV6 so that the amplitude at R OUT (TP8) in the COLOR mode is VR2±10 mVp-p.
10. Adjust G OUT and B OUT in the same manner as R OUT.
    G OUT... TP9, RV7
    B OUT... TP10, RV8
11. Change the position of MODE select switch (COLOR/B&W) on the front panel, and confirm that there are no color difference on the screen in the RGB mode and B&W mode. If not, readjust from step 8.

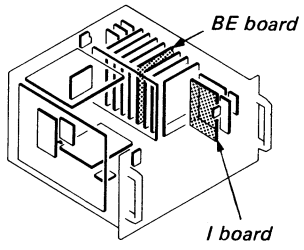
[RGB level adjustment]

12. Set SW102 on the JA board to RGB position, and set the MODE select switch (COLOR/B&W) on the front panel to COLOR position.
13. Measure the VR3 amplitude at the R IN (TP1).
14. Adjust RV9 so that the amplitude at R OUT (TP8) is VR3±10 mVp-p.
15. Adjust G OUT and B OUT in the same manner as R OUT.
    G OUT... TP2 (G IN), TP9 (G OUT), RV10
    B OUT... TP3 (B IN), TP10 (B OUT), RV11

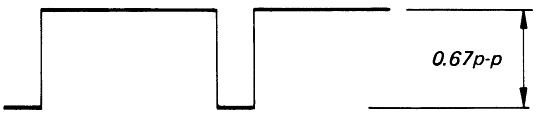
4. BE Board Adjustment

BE Board VIDEO OUT LEVEL Adjustment

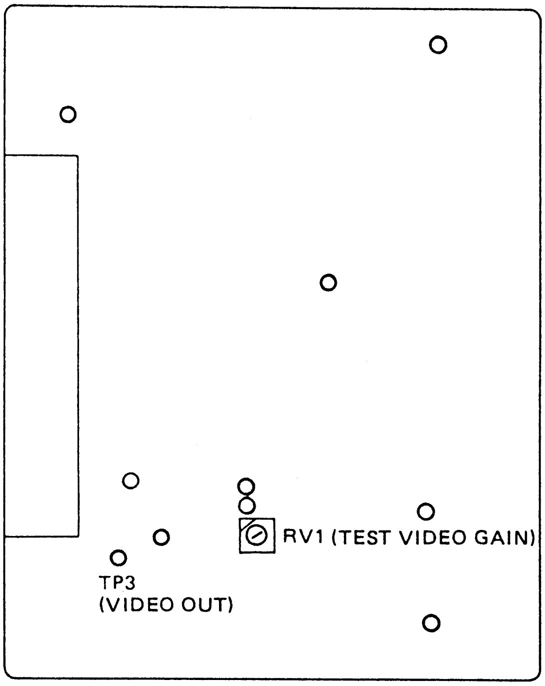

Oscilloscope
TP3
BE board


BE board
I board

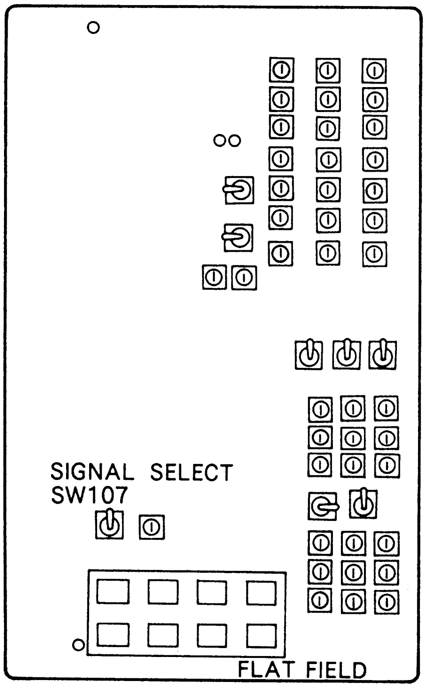
1. Set NOR/TEST (SW6) on the subcontrol panel (I board) to TEST.
2. Set TEST SIGNAL SELECT (SW7) on the I board to FLAT FIELD.
3. Turn on all the DIP switches (SW1) 1 to 4 on the BE board.
4. Observe TP3 with an oscilloscope and turn TEST VIDEO GAIN (RV1) until the level becomes 0.67Vp-p.



BE board

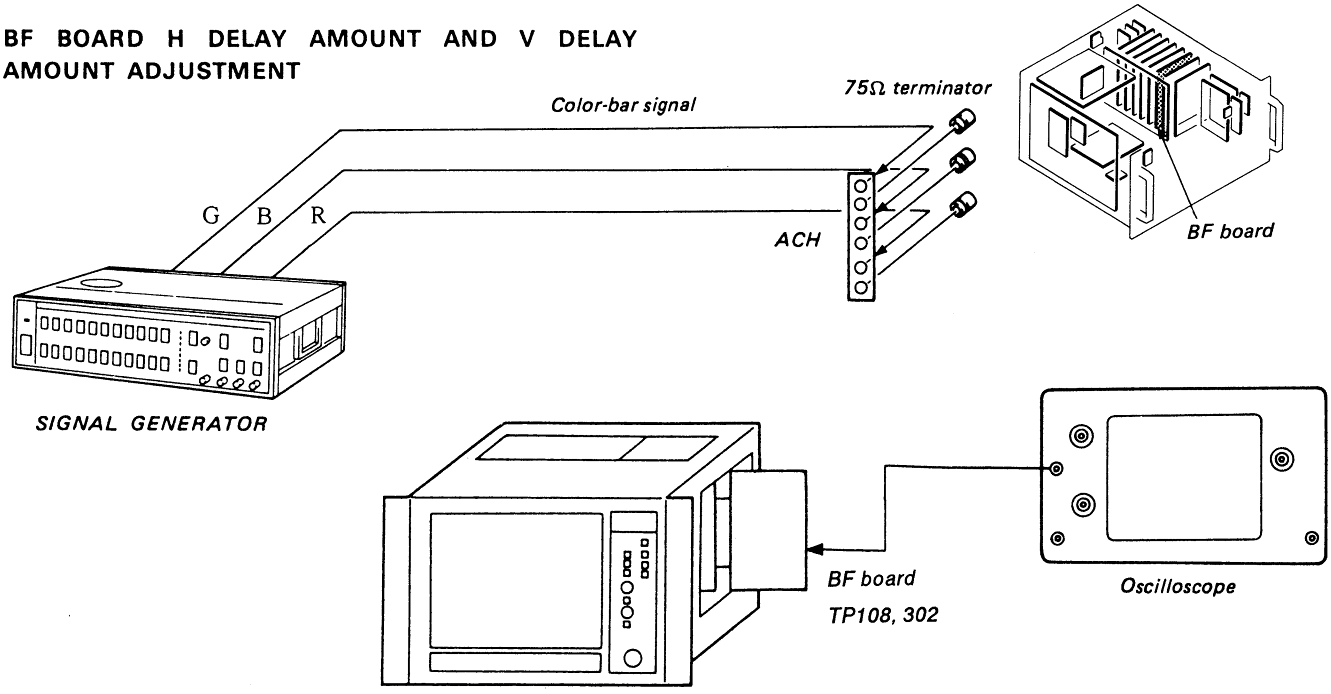

RV1 (TEST VIDEO GAIN)
TP3
(VIDEO OUT)

I board


SIGNAL SELECT
SW107
FLAT FIELD

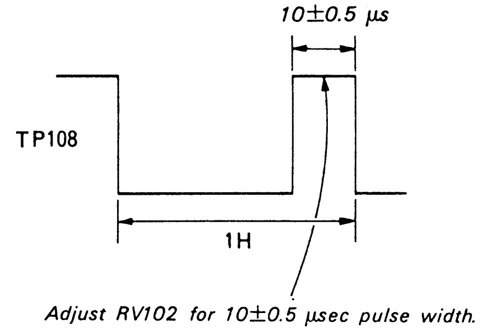
5. BF BOARD ADJUSTMENT

BF BOARD H DELAY AMOUNT AND V DELAY AMOUNT ADJUSTMENT

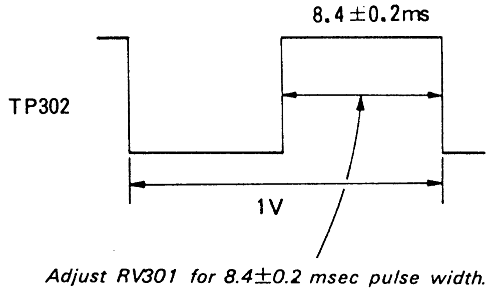

Color-bar signal
75Ω terminator
G
B
R
ACH
BF board
SIGNAL GENERATOR
BF board
TP108, 302
Oscilloscope

1. Input the colorbar signal.
2. Connect an oscilloscope to TP108 on the BF board and set the H DELAY switch to on. Adjust H DELAY (RV102) on the BF board so that the pulse width is 10±0.5 μsec.
3. Connect an oscilloscope to TP302 on the BF board and set the V DELAY switch to on. Adjust V DELAY (RV301) on the BF board so that the pulse width is 8.4±0.2 msec.

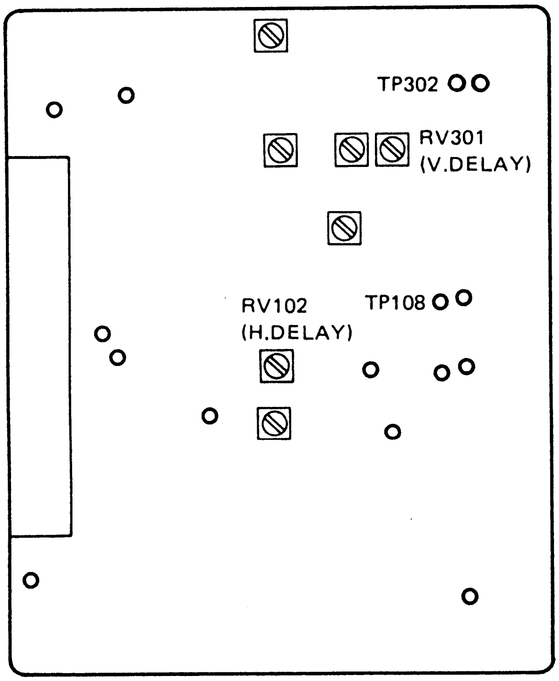
H Delay Amount Adjustment


10±0.5 μs
TP108
1H
Adjust RV102 for 10±0.5 μsec pulse width.

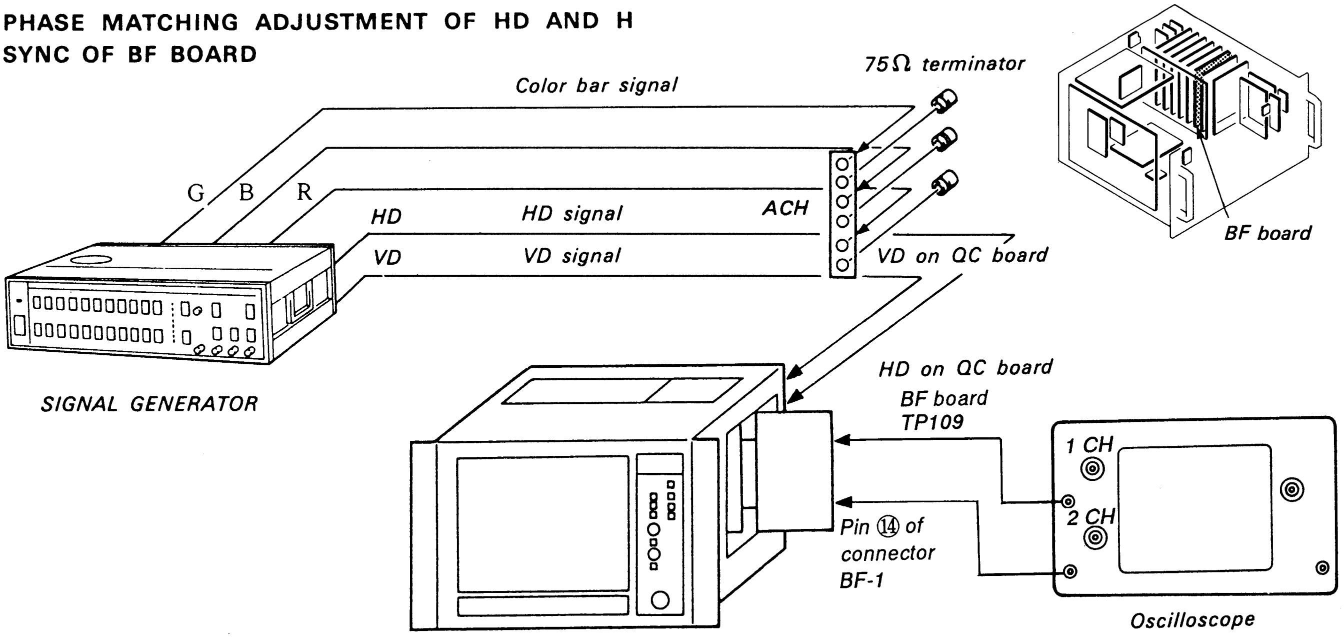
V Delay Amount Adjustment


8.4±0.2ms
TP302
1V
Adjust RV301 for 8.4±0.2 msec pulse width.

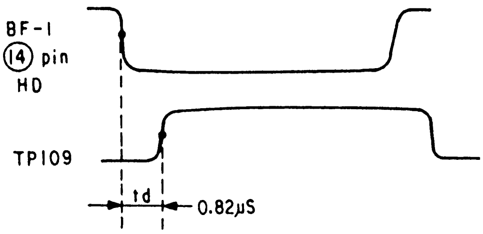
BF board


TP302
RV301
(V.DELAY)
RV102
(H.DELAY)
TP108

PHASE MATCHING ADJUSTMENT OF HD AND H SYNC OF BF BOARD


Color bar signal
75Ω terminator
G
B
R
HD
HD signal
ACH
VD
VD signal
VD on QC board
BF board
SIGNAL GENERATOR
HD on QC board
BF board
TP109
1 CH
2 CH
Pin ⑭ of
connector
BF-1
Oscilloscope

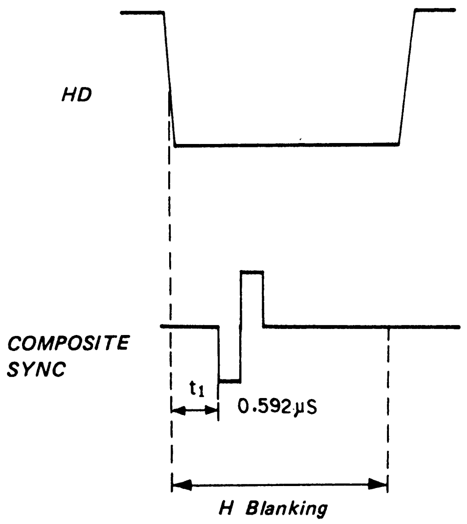
1. Input the color bar signal.
2. Connect an oscilloscope to pin ⑭ of connector BF-1 and TP109 on the BF board and observe the waveform. Adjust RV101 so that 50% portion of td shown below is 0.82 μs.


BF-1
⑭ pin
HD
TP109
td
0.82μS

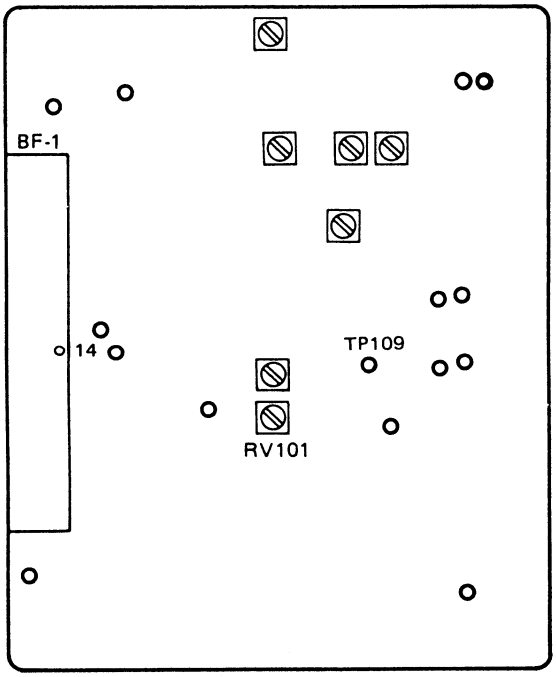
Adjust the pulse width of TP13 to $\Delta t = 0.30 \pm 0.01$ μsec with RV3.

Measure Δt at 50% of the pulse level.

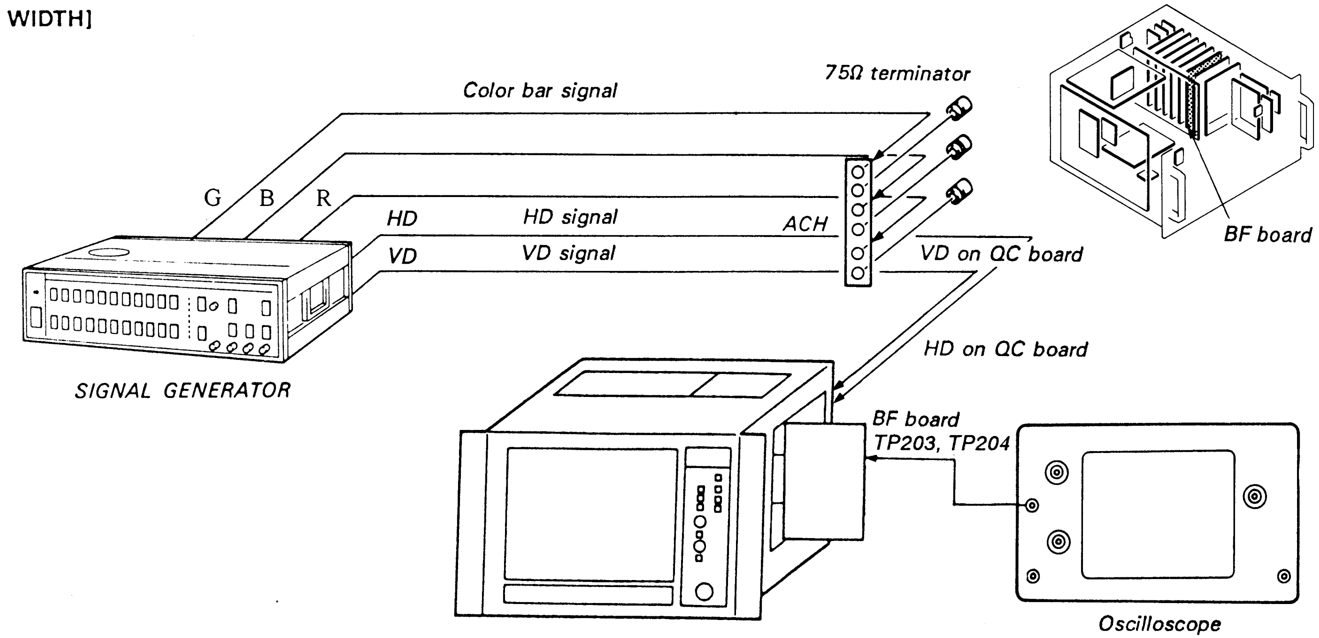
Note: At the time of shipment, input HD and H SYNC as shown in Fig. below and the phase is adjusted. When inputting HD differing from the phase relationship of Fig. below readjust to $\Delta td = t_1 + 0.23$ [μs].


HD
COMPOSITE
SYNC
t1
0.592μS
H Blanking

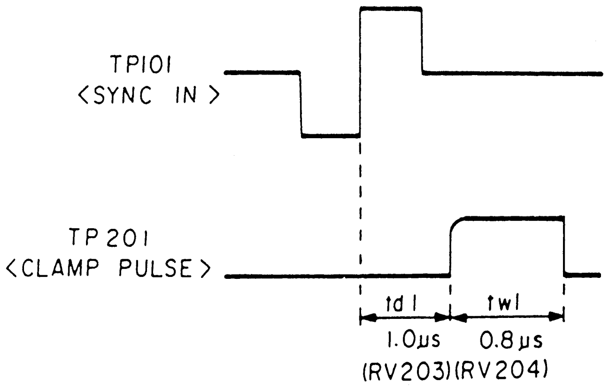
BF board


BF-1
14
TP109
RV101

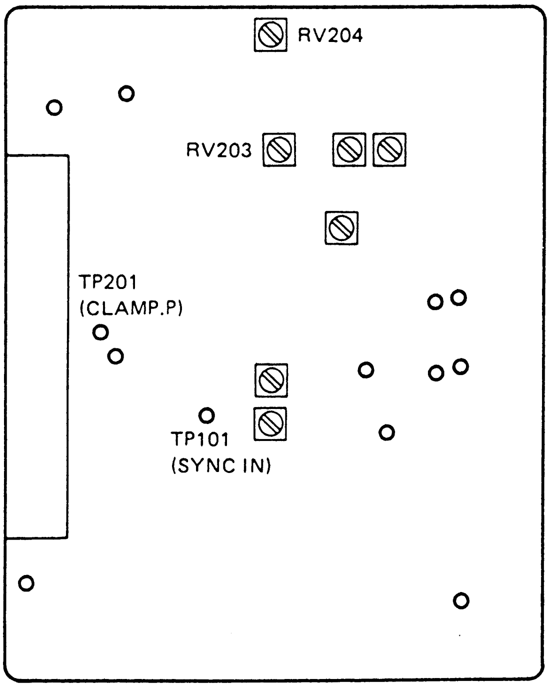
[ADJUSTMENT 1 OF CLAMP PULSE PHASE AND PULSE WIDTH]


Color bar signal
75Ω terminator
G
B
R
HD
HD signal
ACH
VD
VD signal
VD on QC board
HD on QC board
BF board
SIGNAL GENERATOR
BF board
TP203, TP204
Oscilloscope

1. Input the color bar signal.
2. Monitoring TP101 and TP201 on the BF board with an oscilloscope, adjust td_1 and tw_1 in Fig. below with RV203 and RV204. td_1 and tw_1 respectively should be the points where amplitude is 50%.


TP101
<SYNC IN>
TP201
<CLAMP PULSE>
td1
tw1
1.0μs
0.8μs
(RV203)(RV204)

BF board


RV204
RV203
TP201
(CLAMP.P)
TP101
(SYNC IN)

Note:

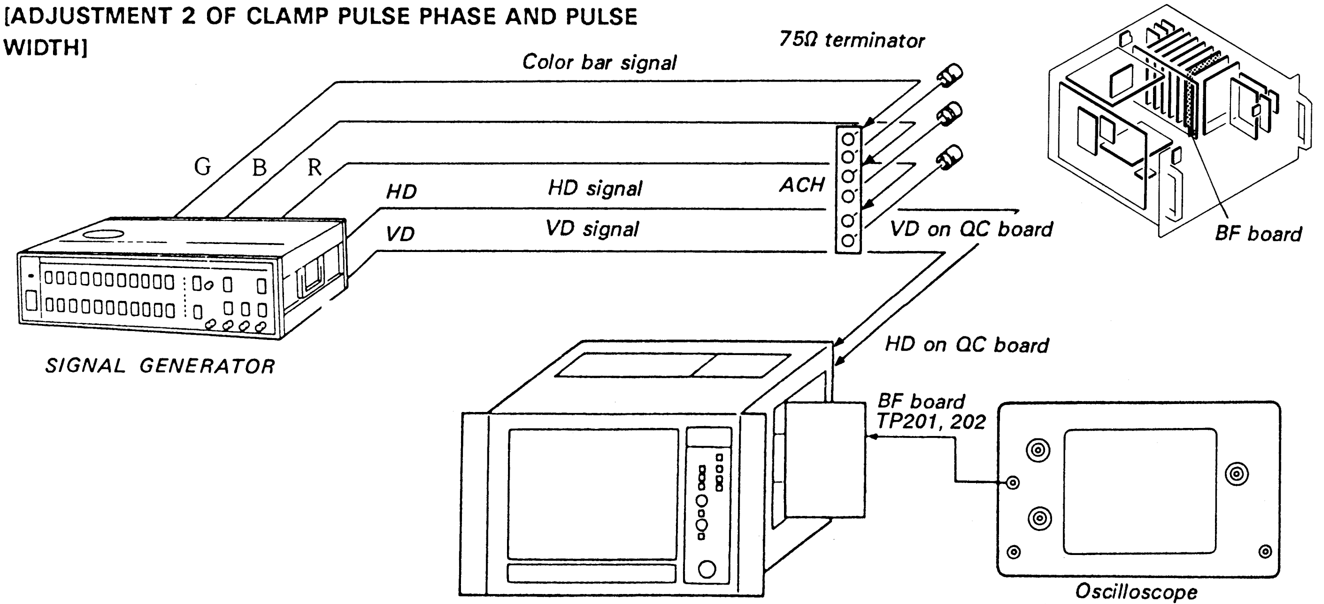
td_1 and tw_1 shown above are the values when the BTA/SMPTE standard for HDTVs and the former HDTV standard (Sony standard or Tsukuba Exposition standard) are input.

When a signal with a back porch of 1.8 μs or less is input, re-adjust to obtain the following.

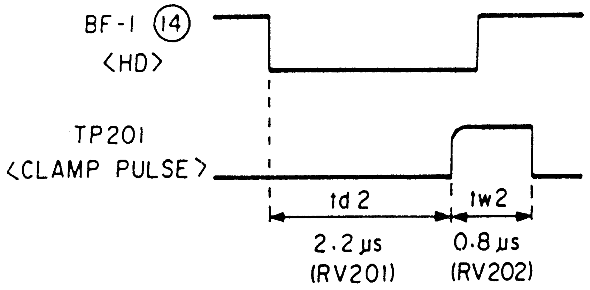
$td_1 + tw_1 <$ BACk-porch period

$tw_1 \geq 0.8$ μs.

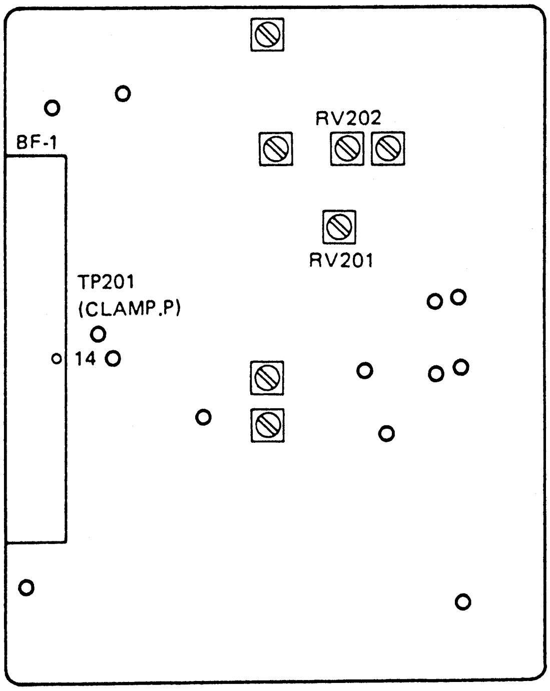
[ADJUSTMENT 2 OF CLAMP PULSE PHASE AND PULSE WIDTH]


75Ω terminator
Color bar signal
G
B
R
HD
HD signal
ACH
VD
VD signal
VD on QC board
BF board
SIGNAL GENERATOR
HD on QC board
BF board TP201, 202
Oscilloscope

1. Input the color bar signal. (In this adjustment, however, non-composite should be used for G signal.)
2. Monitoring pin ⑭ connector BF-1 and TP201 on the BF board with an oscilloscope, adjust td_2 and tw_2 in the Fig. below with RV201 and RV202. td_2 and tw_2 should be measured the points where amplitude is 50%.


BF-1 ⑭
<HD>
TP201
<CLAMP PULSE>
td 2
tw2
2.2 μs
(RV201)
0.8 μs
(RV202)

BF board


RV202
BF-1
RV201
TP201
(CLAMP.P)
14

Note:

As shown in Fig. 1, td_2 and tw_2 are values for the case of $t > 3.3\ \mu s$.

As shown in Fig. 2, when the HD phase is delayed and $t \leqq 3.3\ \mu s$, the clamp pulse enters into the video signal period. When the HD signal like $t \leqq 3.3\ \mu s$ is input, adjust to obtain the following.

$td_2 + tw_2 < t$

$tw_2 \geqq 0.8\ \mu s$

Fig. 1

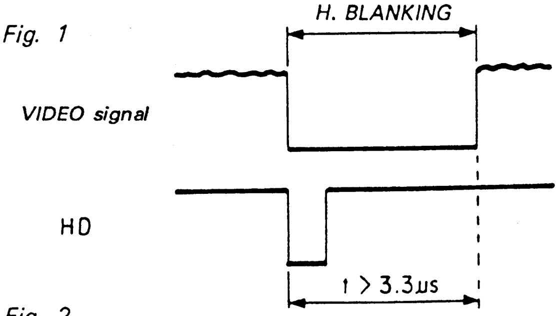
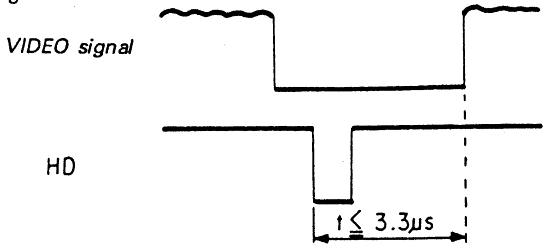
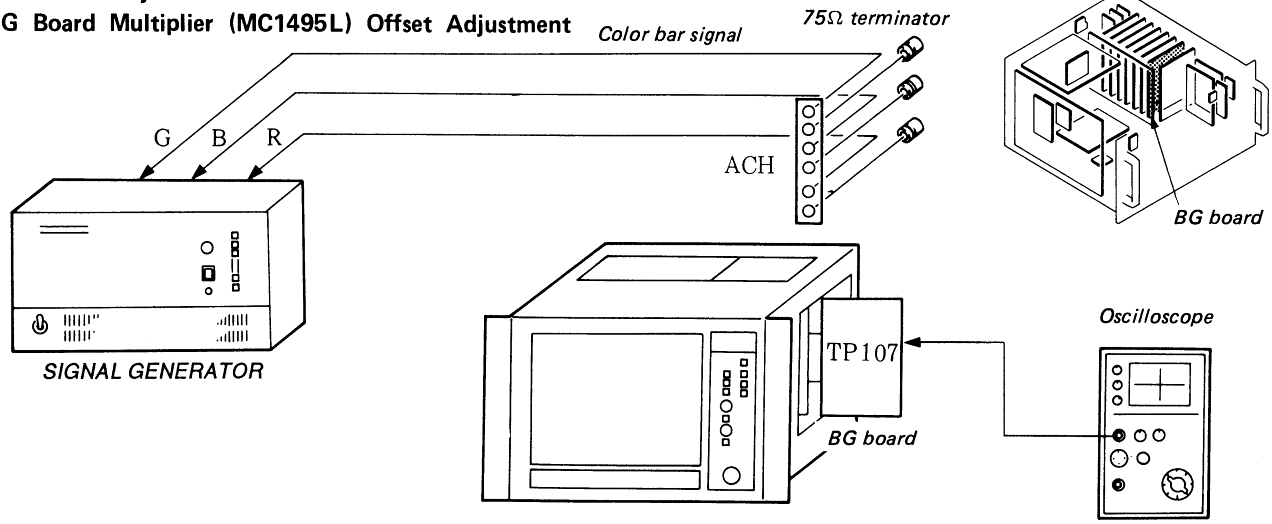

H. BLANKING
VIDEO signal
HD
t > 3.3μs

Fig. 2


VIDEO signal
HD
t ≦ 3.3μs

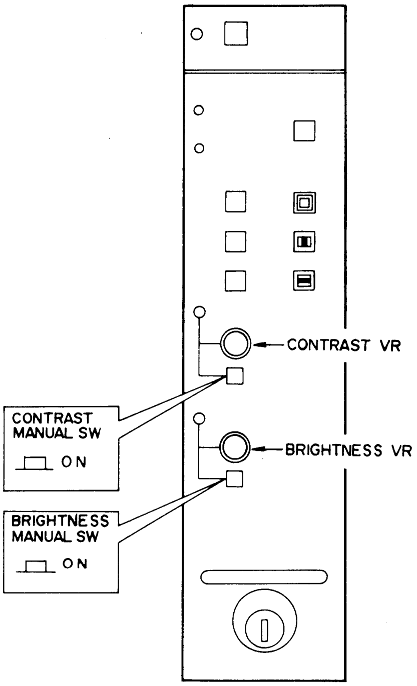
6. BG Board Adjustment

BG Board Multiplier (MC1495L) Offset Adjustment

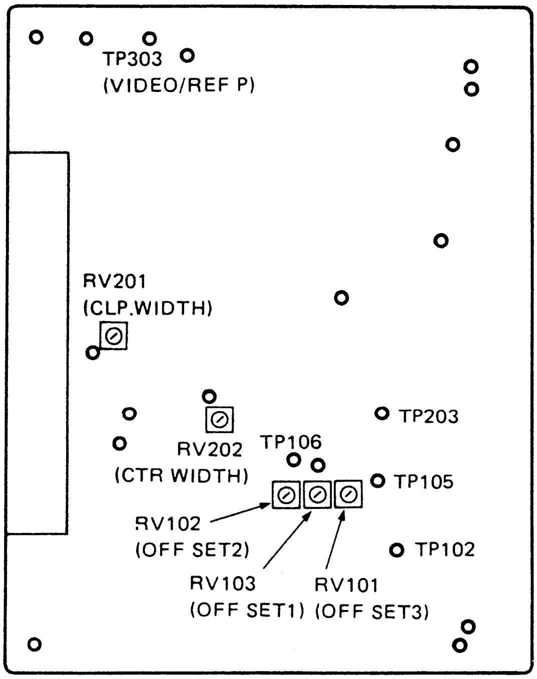

Color bar signal
75Ω terminator
G
B
R
ACH
SIGNAL GENERATOR
TP107
BG board
Oscilloscope
BG board

1. Input the dot signal.
2. Turn on CONTRAST MANUAL SW.
3. Turn on BRIGHTNESS MANUAL SW.
4. Connect TP106 to GND.
5. Connect the cscilloscope probe to TP102 on the BG bpoard.
6. Adjust OFFSET-2 RV102 so that the DC level at TP102 will not change by turning CONTRAST CONTROL VR on the front panel. (The variation should be within 20mV.)
7. Disconnect TP106 from GND and connect TP105 to GND.
8. Adjust OFFSET-1 RV103 so that the DC level at TP102 will not change by turning BRIGHTNESS CONTROL VR on the front panel. (The variation should be within 20mV.)
9. With TP105 connected to GND, adjust OFFSET-3 RV101 until the DC level at TP102 becomes 0V (0V ± 10mV).

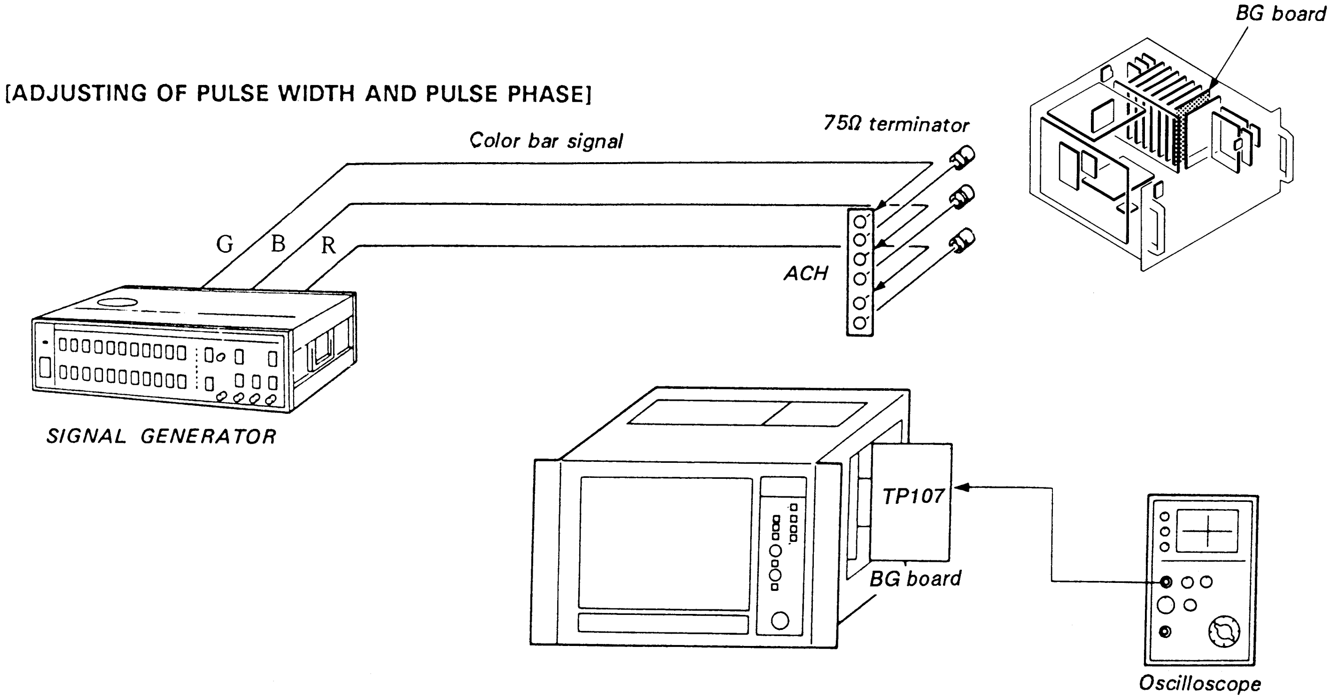
Front panel


CONTRAST VR
BRIGHTNESS VR
CONTRAST MANUAL SW
ON
BRIGHTNESS MANUAL SW
ON

BG board

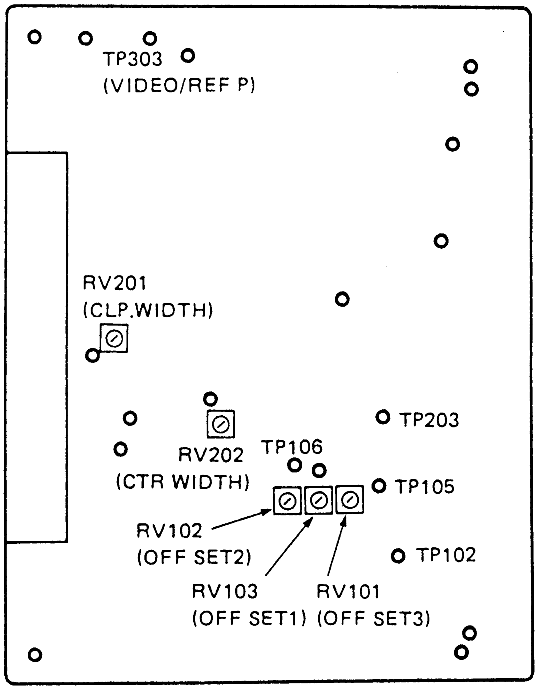

TP303
(VIDEO/REF P)
RV201
(CLP.WIDTH)
TP203
RV202
(CTR WIDTH)
TP106
TP105
RV102
(OFF SET2)
TP102
RV103
(OFF SET1)
RV101
(OFF SET3)

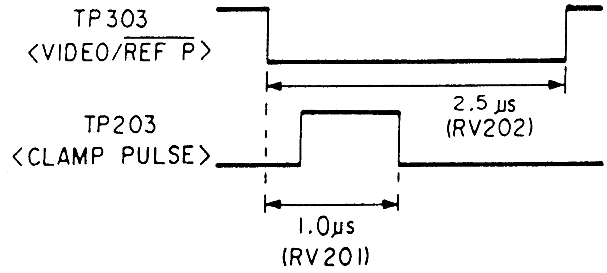
[ADJUSTING OF PULSE WIDTH AND PULSE PHASE]


BG board
75Ω terminator
Color bar signal
G
B
R
ACH
SIGNAL GENERATOR
TP107
BG board
Oscilloscope

1. Input the color bar signal.
2. As shown in the Fig. below, adjust the phases of TP303 and TP203 with RV201.
3. Adjust the pulse width of TP303 with RV202.

BG board


TP303
(VIDEO/REF P)
RV201
(CLP.WIDTH)
TP203
RV202
(CTR WIDTH)
TP106
TP105
RV102
(OFF SET2)
TP102
RV103
(OFF SET1)
RV101
(OFF SET3)


TP303
<VIDEO/REF P>
TP203
<CLAMP PULSE>
2.5 μs
(RV202)
1.0μs
(RV201)

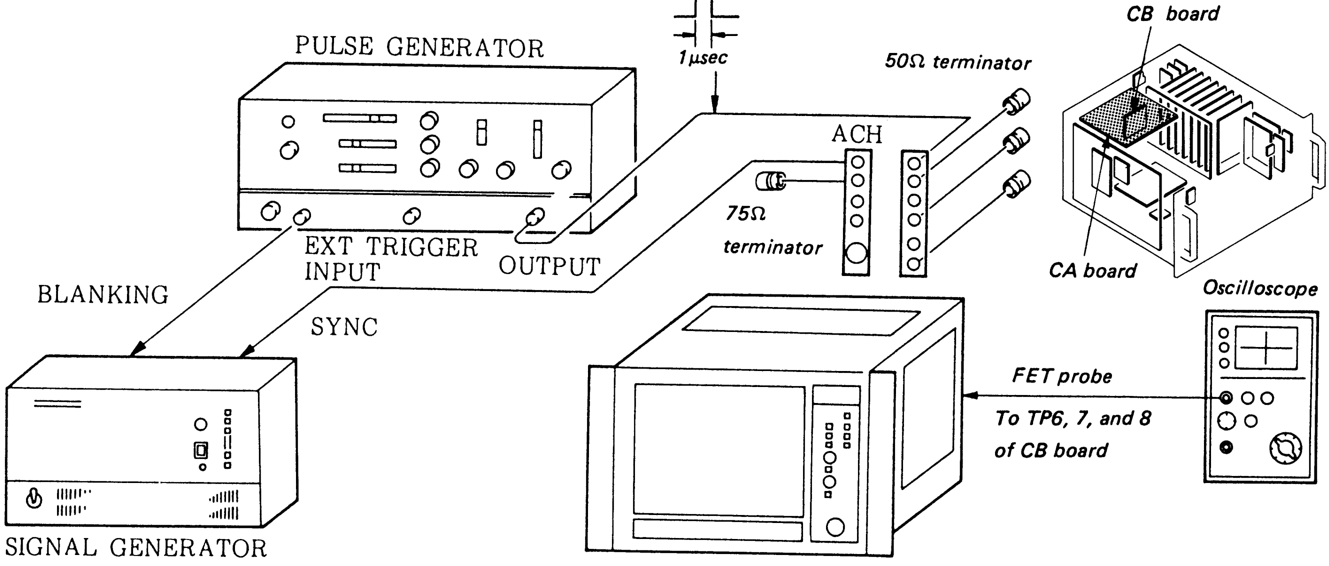
Note:

Measurements should be performed at 50% of the pulse amplitude.

7. CA Board Adjustment

CA Board Pulse Response Adjustment

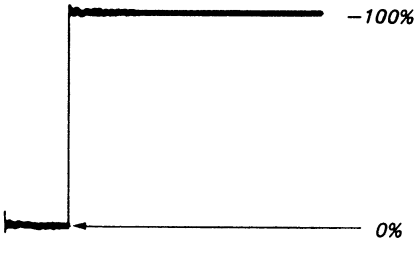
0.7Vp-p
tr = tf = 10μsec
Overshoot, undershoot, and preshoot are lower than 1%


CB board
PULSE GENERATOR
1μsec
50Ω terminator
ACH
75Ω terminator
EXT TRIGGER INPUT
OUTPUT
CA board
Oscilloscope
BLANKING
SYNC
FET probe
To TP6, 7, and 8 of CB board
SIGNAL GENERATOR

1. KR pulse response adjustment (Use FET probe only when adjusting with RV)
   (1) Set SYNC SW on the front panel to EXT (Fig. 7-1).
   (2) Input a pulse generator output to the R channel.
   (3) Adjust the amplitude at TP6 (KR) to 30 Vp-p by turning CONTRAST CONTROL VR as in Fig. 7-1.
   (4) Adjust the overshoot, undershoot, and preshoot to within ± 10% with R HIGH FREQUENCY (RV301).
   (5) Adjust the smear to within ± 1% with R MIDDLE FREQUENCY (CV301).
2. Adjust KG, KB in the same way.
   (1) Use TP7, RV201, and CV201 to adjust KG.
   (2) Use TP8, RV101, and CV101 to adjust KB.
3. Verify that no smear with GRAY S of TEST SIGNAL SELECT (SW7) is on the I board.

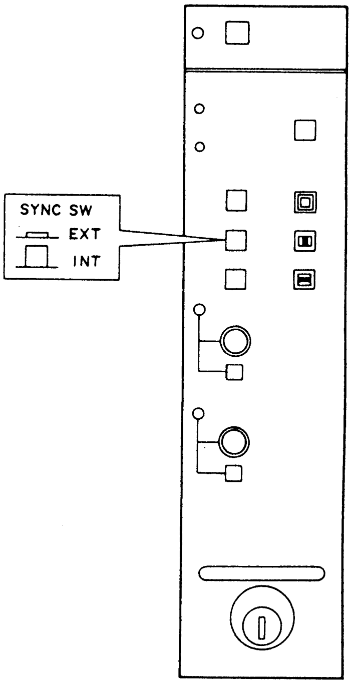
* See page 4-32 for TR, RV and CV positions on the CA and CB boards.

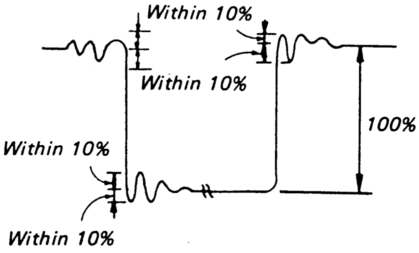
* Input signal is 0.7Vp-p (when terminated with 50Ω) rising. Falling time is 10μsec within 1%. Pulse width 1μsec.
Overshoot, undershoot, and preshoot.



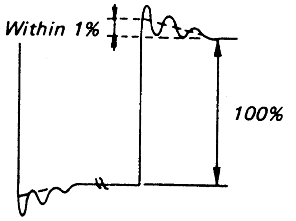
Waveform at TP6, 7, 8

Front panel


SYNC SW
EXT
INT

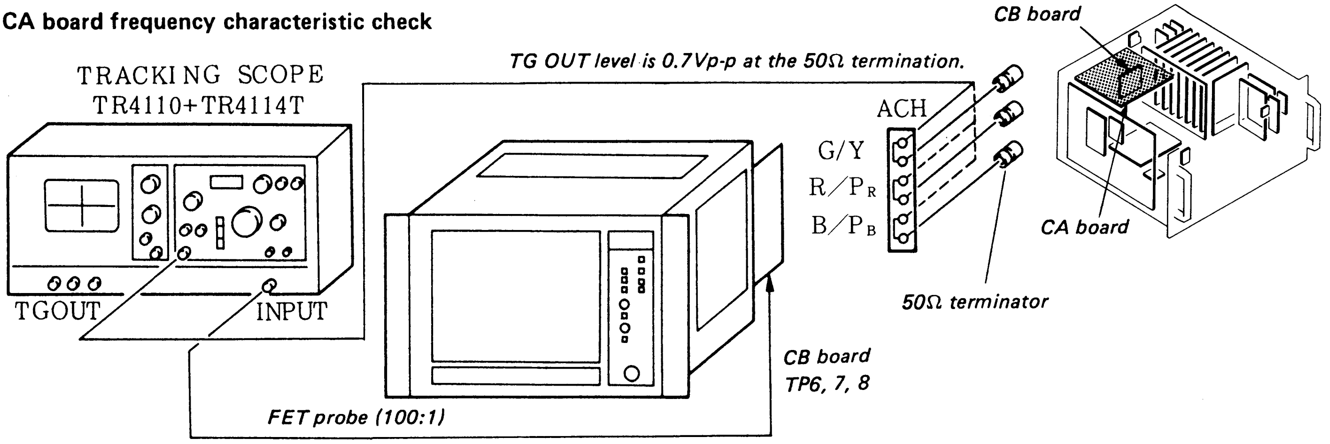

Within 10%
Within 10%
100%
Within 10%
Within 10%

Overshoot, undershoot, and preshoot adjustment


Within 1%
100%

Smear adjustment (measure the average of ringing)

CA board frequency characteristic check


TRACKING SCOPE
TR4110+TR4114T
TGOUT
INPUT
TG OUT level is 0.7Vp-p at the 50Ω termination.
ACH
G/Y
R/PR
B/PB
CB board
CA board
50Ω terminator
CB board
TP6, 7, 8
FET probe (100:1)

* SYNC SW is made to EXT.

[KR frequency characteristic adjustment]

1. Input a tracking scope output to the R channel.
2. Adjust the amplitude at KR (TP6) to 30Vp-p by turning CONTRAST VR.
3. Verify the frequency characteristics to be within ± 1.5dB over 60Hz to 30MHz.

[KG frequency characteristic adjustment]

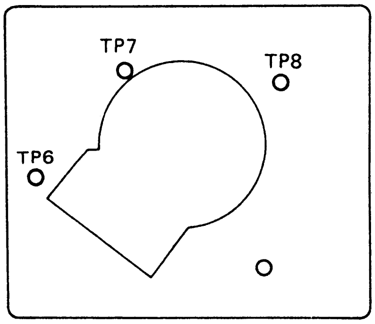
1. Input a tracking scope output to the G channel.
2. Adjust the amplitude at KG (TP7) to 30Vp-p by turning CONTRAST VR.
3. Verify the frequency characteristics to be within ± 1.5dB over 60Hz to 30MHz.

[KB frequency characteristic verification]

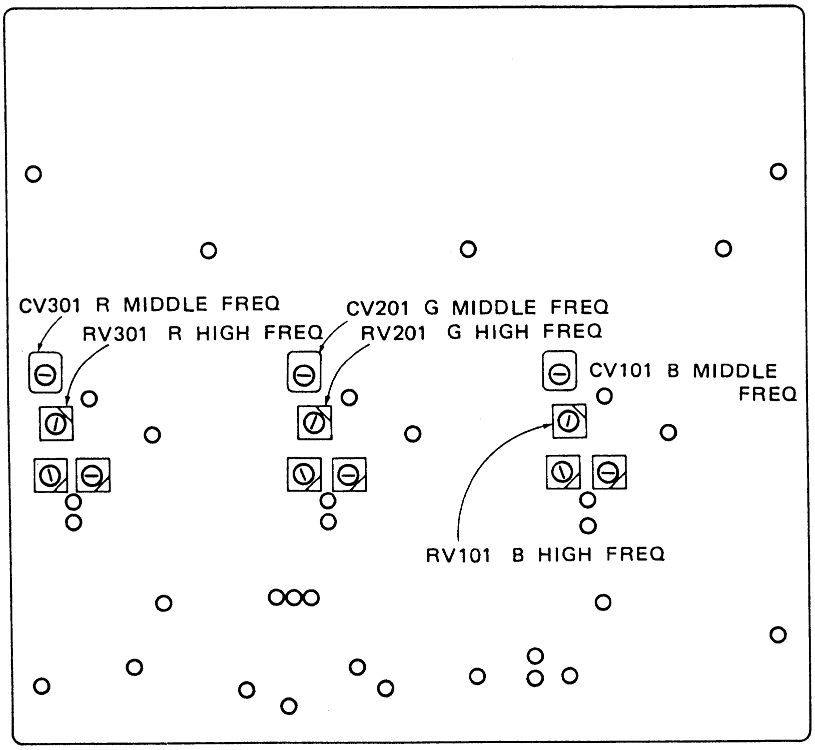
1. Input a tracking scope output to the B channel.
2. Adjust the amplitude at KB (TP8) to 30Vp-p by turning CONTRAST VR.
3. Verify the frequency characteristics to be within ± 1.5dB over 60Hz to 30MHz, by B HIGH FREQUENCY (RV101).
4. Verify that no smear with GRAY S of SIGNAL SELECT (SW107) is on the I board.

* When it is not within ± 1.5dB, repeat the adjustment in accordance with P.4-31.

CB board



CA board

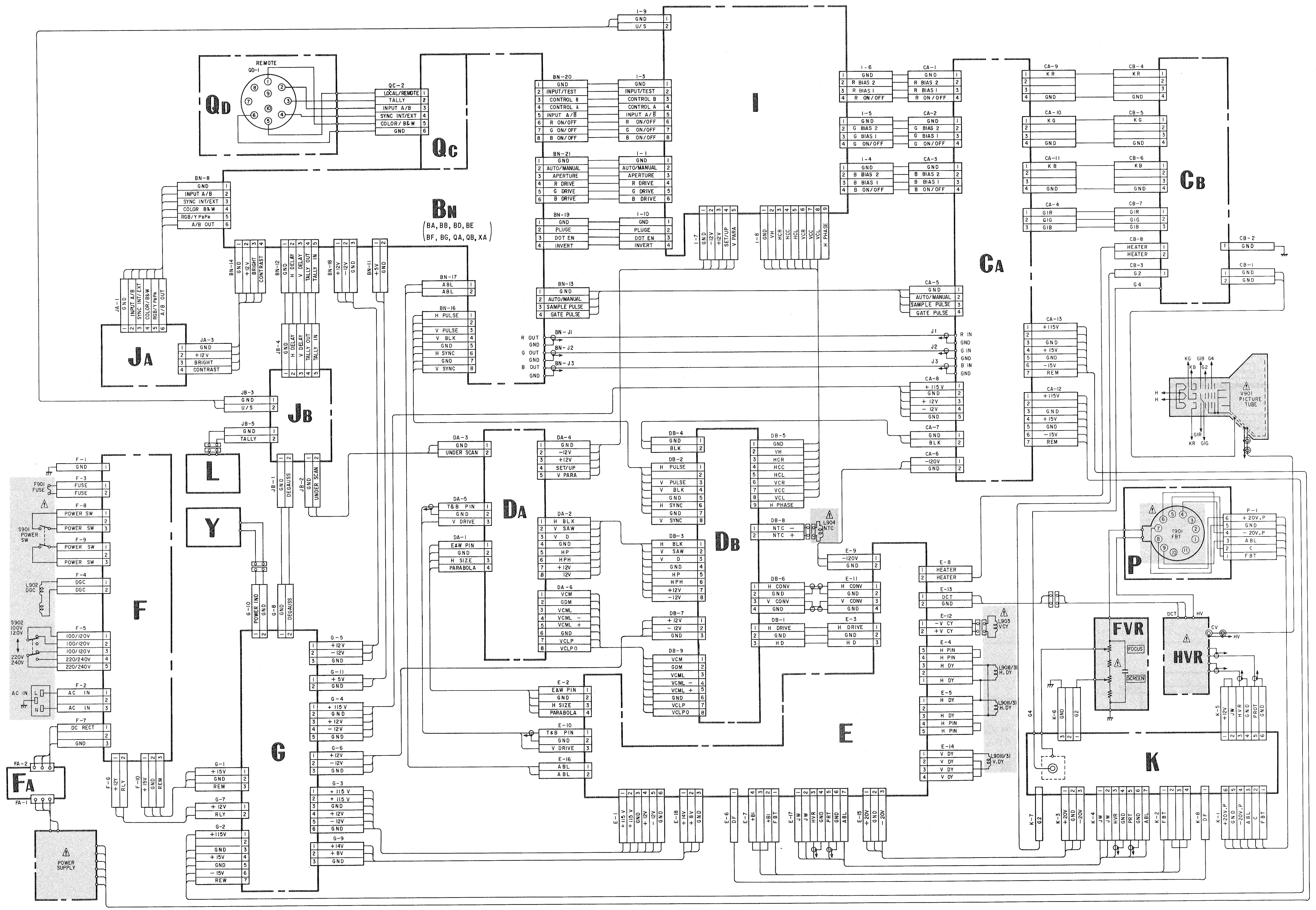

CV301 R MIDDLE FREQ
RV301 R HIGH FREQ
CV201 G MIDDLE FREQ
RV201 G HIGH FREQ
CV101 B MIDDLE FREQ
RV101 B HIGH FREQ

SECTION 5
DIAGRAMS

5-1. BLOCK DIAGRAM

QA (VIDEO SIGNAL INPUT)
QB (VIDEO SIGNAL INPUT)
QC (EXT.SYNC/HD/VD INPUT)
QD (REMOTE CONTROL INPUT)
BA (INPUT SWITCHING)
BB (Y/PB/PR MATRIX) APERTURE CONTROL
I D/21 (SIGNAL SELECT SW, APERTURE SW & ADJ)
BD (CONTRAST/GAIN CONTROL)
CA (VIDEO OUTPUT)
BE (BUILT-IN SIGNAL GENERATOR)
BF (BUILT-IN SIGNAL GENERATOR)
BG (PULSE GENERATOR)
JA (SIGNAL SWITCH, CONTRAST/BRIGHTNESS VOLUMES)
JB (SCAN MODE/DELAY SWITCH)
Y (POWER SUPPLY INDICATOR LAMP)
L (TALLY LAMP)
F (AC RECTIFIER/FILTER)
G (POWER SUPPLY DIVIDING)
DA (DEFLECTION IMAGE DISTORTION COMPENSATION)
I D/22 (SUB CONVERGENCE, WHITE BALANCE)
DB HORIZONTAL/VERTICAL OSCILLATOR, CONVERGENCE
E (DEFLECTION OUTPUT)
K
FVR
HVR
P
CB (PICTURE TUBE SOCKET)
PICTURE TUBE

5-2. FRAME WIRING DIAGRAM


QD
QC
I
BN
(BA, BB, BD, BE
BF, BG, QA, QB, XA)
CA
CB
JA
JB
L
Y
F
FA
POWER SUPPLY
G
DA
DB
E
P
FVR
HVR
K
PICTURE TUBE

5-3. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS
— Conductor Side —

Note: The components identified by shading and mark ⚠ are critical for safty. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une piece portant le numéro spécifié.

Note:

- All capacitors are in μF unless otherwise noted. p: $\mu\mu$F
  50 WV or less are not indicated except for electrolytic and tantalums.
- All resistors are in ohms, 1/6W on the BD, QA and QB boards and 1/4W on the rest of the boards unless otherwise specified 1/6W, 1% for metal (RN) unless otherwise specified.
- ▭ : nonflamable resistor.
- ▭ : fusible resistor.
- △ : internal component.
- ▭ : panel designation.
- All variable and adjustable resistors have charactristic curve B, unless otherwise noted.
- The components indentified by ☒ in this manual have been carefully factory-selected for each set in order to satisty regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components indicated by ◪ mark the necessary adjustments indicated. If results do not meet the specified value, change the component identified by ☒ and repeat the adjustment until the specified value is achieved. (Refer to ☒D40, ☒R115, ☒R140, ☒R141 adjustment on page 4-11 to 4-13.)
  When replacing the part in below table, be sure to perform the related adjustment.

Part replaced (◪)	Adjustment (☒)
D40, R114, R115, R116, RV2 (E board)	D40, R115 (Page 4-11)
D39, R140, R141, R144 (E board)	R140, R141 (Page 4-11)

Reference information

RESISTOR	RN	: METAL FILM
	RC	: SOLID
	FPRD	: NONFLAMMBLE CARBON
	FUSE	: NONFLAMMBLE FUSIBLE
	RS	: NONFLAMMBLE METAL OXIDE
	RB	: NONFLAMMBLE CEMENT
	RW	: NONFLAMMBLE WIREWOUND
	※	: ADJUSTMENT RESISTOR
COIL	LF-8L	: MICRO INDUCTOR
CAPACITOR	TA	: TANTALUM
	PS	: STYROL
	PP	: POLYPROPYLENE
	PT	: MYLAR
	MPS	: METALIZED POLYESTER
	MPP	: METALIZED POLYPROPYLENE
	ALB	: BIPOLAR
	ALT	: HIGH TEMPERATURE
	ALR	: HIGH RIPPLE

- Readings are taken with a color-bar signal input.
  BE board
  ( ) : INPUT/TEST SIGNAL selector
  (S107 on I board) ········HATCH
  BB board
  < > : INPUT A mode selector
  (S102 on JA board)········Y PB PR
- Readings are taken with a 10 MΩ digital maltimeter.
- Voltage are dc with respect to ground unless otherwise noted.
- Voltage variations may be neted due to normal production tolerances.
- ▭ : adjustment for repair.
- ✳ : Can not be measured.
- ▬▬ : B+ bus.
- ‒ ‒ ‒ : B– bus.

- Switches and controls are set as tollows unless otherwise noted.

FRONT PANEL

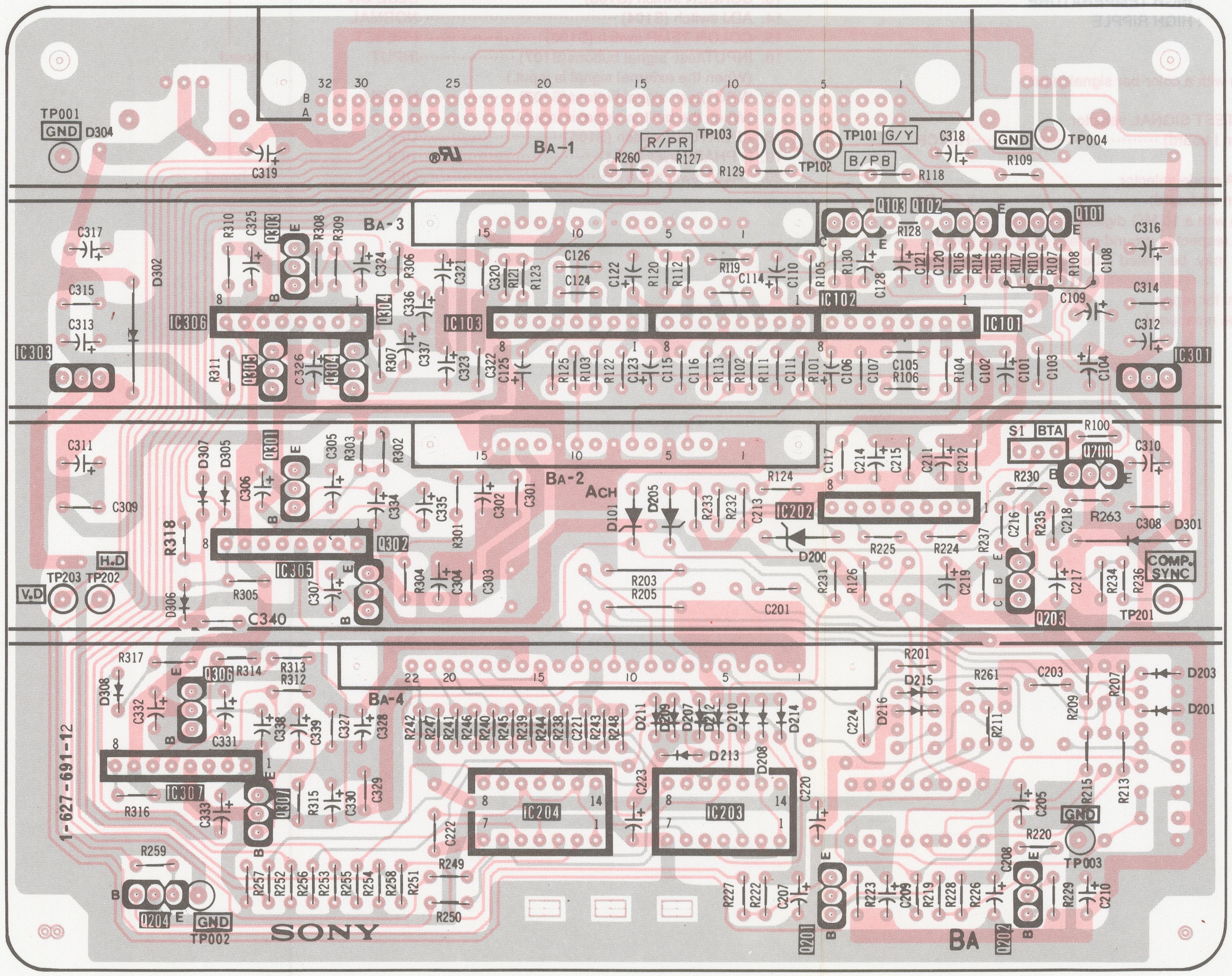
1. INPUT swtch	A (⊓)	JA board
2. SYNC switch	INT (⊓)	
3. MODE switch	COLOR (⊓)	
4. CONTRAST MANUAL switch	PRESET (⊓)	
5. BRIGHTNESS MANUAL switch	PRESET (⊓)	
6. ⊟ SCAN MODE V.DELAY switch	OFF (⊓)	JB board
7. ◫ SCAN MODE H.DELAY switch	OFF (⊓)	
8. ⊡ SCAN MODE UNDER switch	OFF (⊓)	

SUB CONTROL PANEL

9. INPUT A MODE SELECT switch	GBR	JA board
10. INPUT B MODE SELECT switch	GBR	
11. SCREEN switch (S101)	RED ON	I board
12. SCREEN switch (S102)	GREEN ON	
13. SCREEN switch (S103)	BLUE ON	
14. ADJ switch (S104)	NORMAL	
15. COLOR TEMP switch (S106)	PRESET	
16. INPUT/test signal buttons(S107) (When the external signal is input.)	INPUT	
17. INPUT/test signal buttons(S107) (When the built-in signal is input.)	HATCH	
18. APERTURE switch (S105)	OFF	
19. H PHASE switch (S1)	16:9	
20. TALLY switch(SW5)	OFF	JB board

BA board (INPUT SWITCHING)

IC	303 307 306 305 103 204 102 203 101 202 301
Q	204 306 305 303 307 301 302 304 103 201 102 101 203 200 202
D	308 302 306 307,305 101,205 209 211 207 213 210 212 200 214 208 215 216 203 301,201
TP	TP001,202 TP002 TP103,102,101 TP004 TP003 TP201

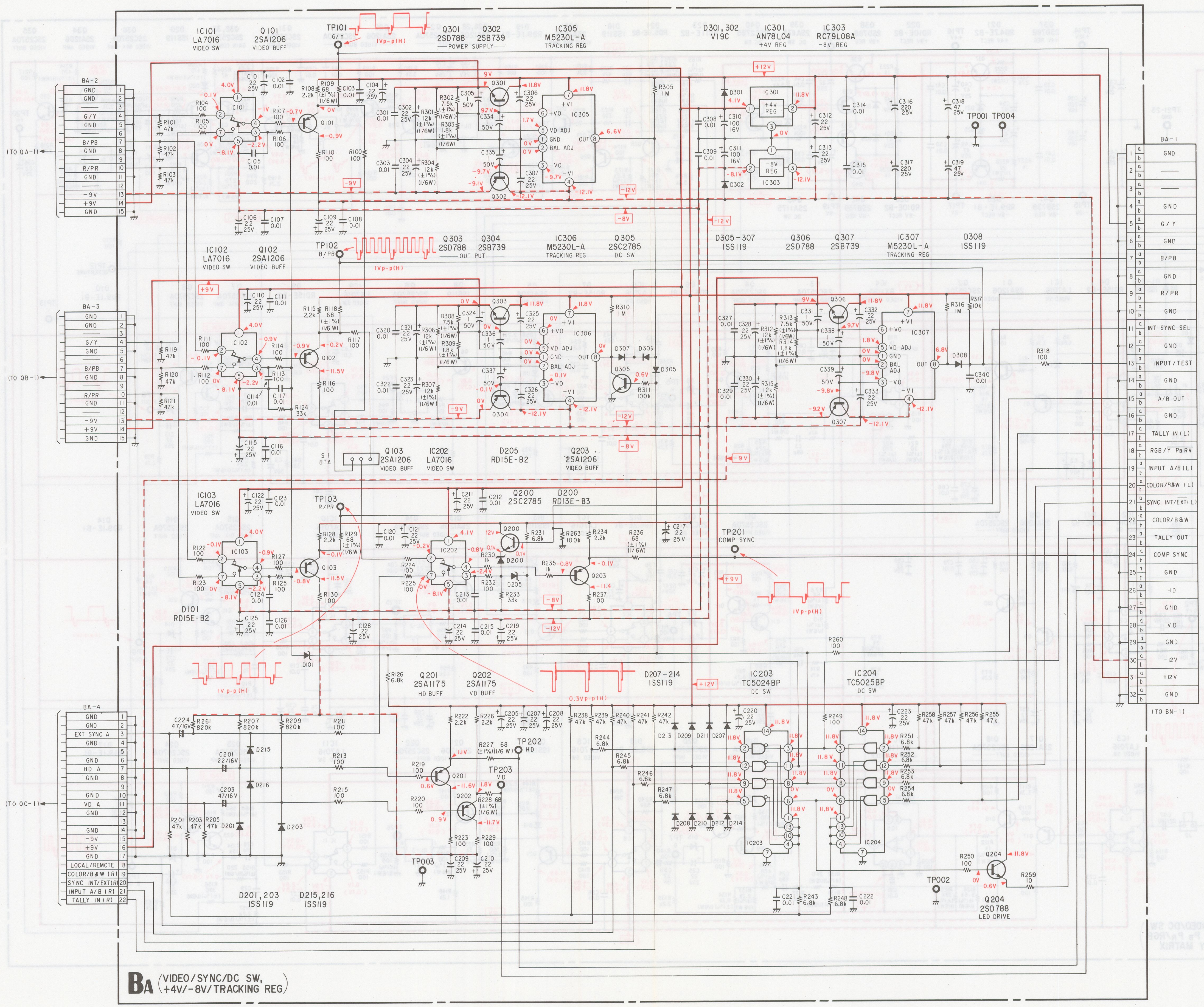


BA-1
BA-2
BA-3
BA-4
ACH
TP001
GND
TP002
TP003
TP004
TP101
TP102
TP103
TP201
TP202
TP203
R/PR
G/Y
B/PB
H.D
V.D
COMP. SYNC
S1
BTA
IC101
IC102
IC103
IC202
IC203
IC204
IC301
IC303
IC305
IC306
IC307
1-627-691-12
SONY
BA

● ▨ : Conductor side pattern

● 🟥 : Component side pattern

BA board (INPUT SWITCHING)


IC101 LA7016 VIDEO SW
Q101 2SA1206 VIDEO BUFF
TP101 G/Y
Q301 2SD788 Q302 2SB739 POWER SUPPLY
IC305 M5230L-A TRACKING REG
D301, 302 V19C
IC301 AN78L04 +4V REG
IC303 RC79L08A -8V REG
BA-2
(TO QA-1)
IC102 LA7016 VIDEO SW
Q102 2SA1206 VIDEO BUFF
TP102 B/PB
Q303 2SD788 Q304 2SB739 OUT PUT
IC306 M5230L-A TRACKING REG
Q305 2SC2785 DC SW
D305-307 1SS119
Q306 2SD788
Q307 2SB739
IC307 M5230L-A TRACKING REG
D308 1SS119
BA-3
(TO QB-1)
Q103 2SA1206 VIDEO BUFF
IC202 LA7016 VIDEO SW
D205 RD15E-B2
Q203 2SA1206 VIDEO BUFF
IC103 LA7016 VIDEO SW
TP103 R/PR
Q200 2SC2785
D200 RD13E-B3
TP201 COMP SYNC
D101 RD15E-B2
Q201 2SA1175 HD BUFF
Q202 2SA1175 VD BUFF
D207-214 1SS119
IC203 TC5024BP DC SW
IC204 TC5025BP DC SW
BA-4
(TO QC-1)
TP202 HD
TP203 VD
TP003
TP002
TP001 TP004
Q204 2SD788 LED DRIVE
D201, 203 1SS119
D215, 216 1SS119
BA-1
(TO BN-1)
BA (VIDEO/SYNC/DC SW, +4V/-8V/TRACKING REG)

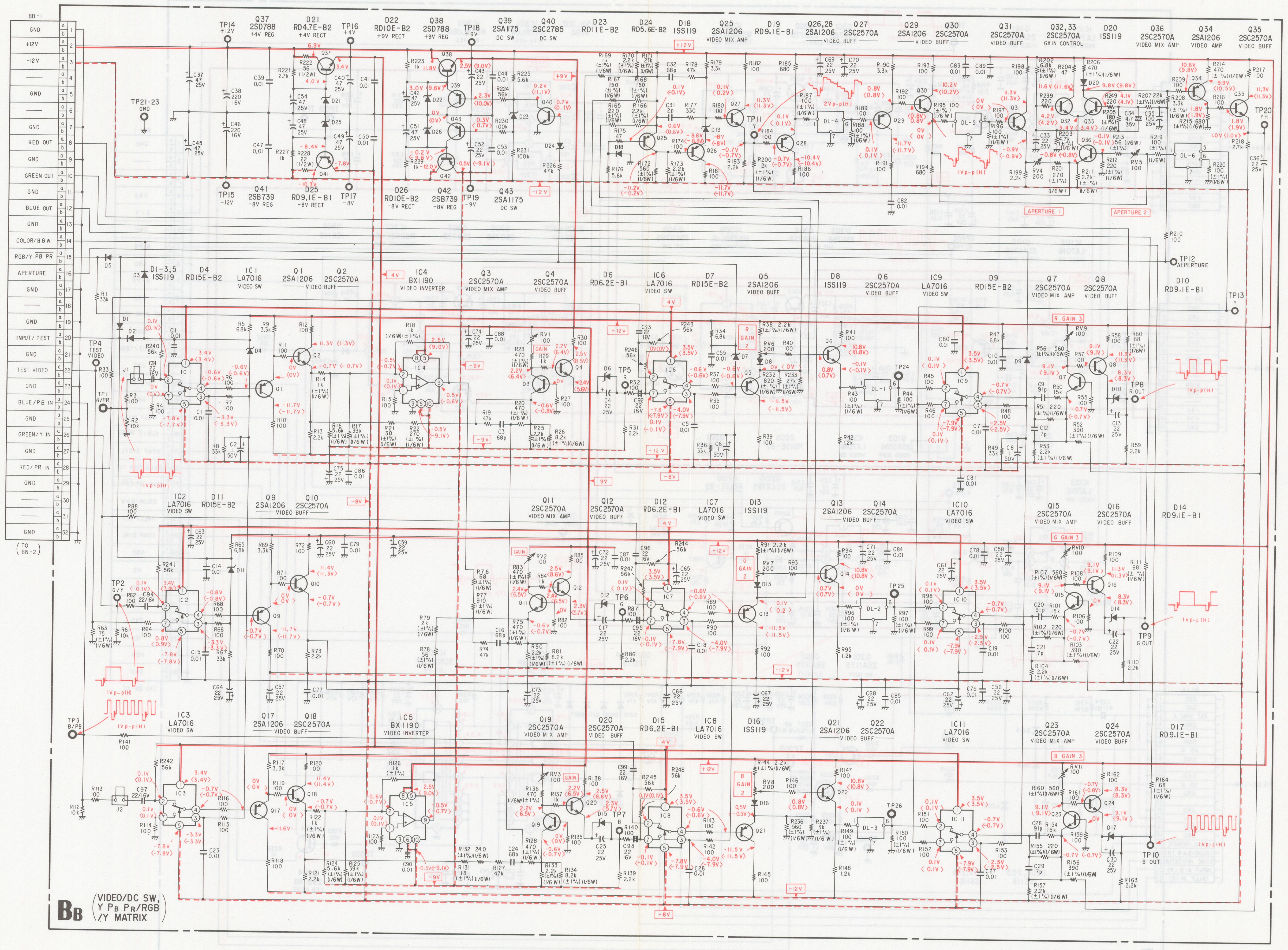
BA board

IC101	LA7016	VIDEO SW
102	LA7016	VIDEO SW
103	LA7016	VIDEO SW
202	LA7016	VIDEO SW
203	TC5024BP	DC SW
204	TC5025BP	DC SW
301	AN78L04	+4V REG
303	RC79L08A	-8V REG
305	M5230L-A	TRACKING REG
306	M5230L-A	TRACKING REG
307	M5230L-A	TRACKING REG
Q101	2SA1206	VIDEO BUFF
102	2SA1206	VIDEO BUFF
103	2SA1206	VIDEO BUFF
Q200	2SC2785	
201	2SA1175	HD BUFF
202	2SA1175	VD BUFF
203	2SA1206	VIDEO BUFF
204	2SD788	LED DRIVE
301	2SD788	POWER SUPPLY
302	2SB739	POWER SUPPLY
303	2SD788	OUTPUT
304	2SB739	OUTPUT
305	2SC2785	DC SW
306	2SD788	
307	2SB739	
D101	RD15EB2	
D200	RD13EB3	
201	1SS119	
203	1SS119	
205	RD15EB2	
207	1SS119	
208	1SS119	
209	1SS119	
210	1SS119	
211	1SS119	
212	1SS119	
213	1SS119	
214	1SS119	
215	1SS119	
216	1SS119	
301	V19C	
302	V19C	
305	1SS119	
306	1SS119	
307	1SS119	
308	1SS119	

BB board

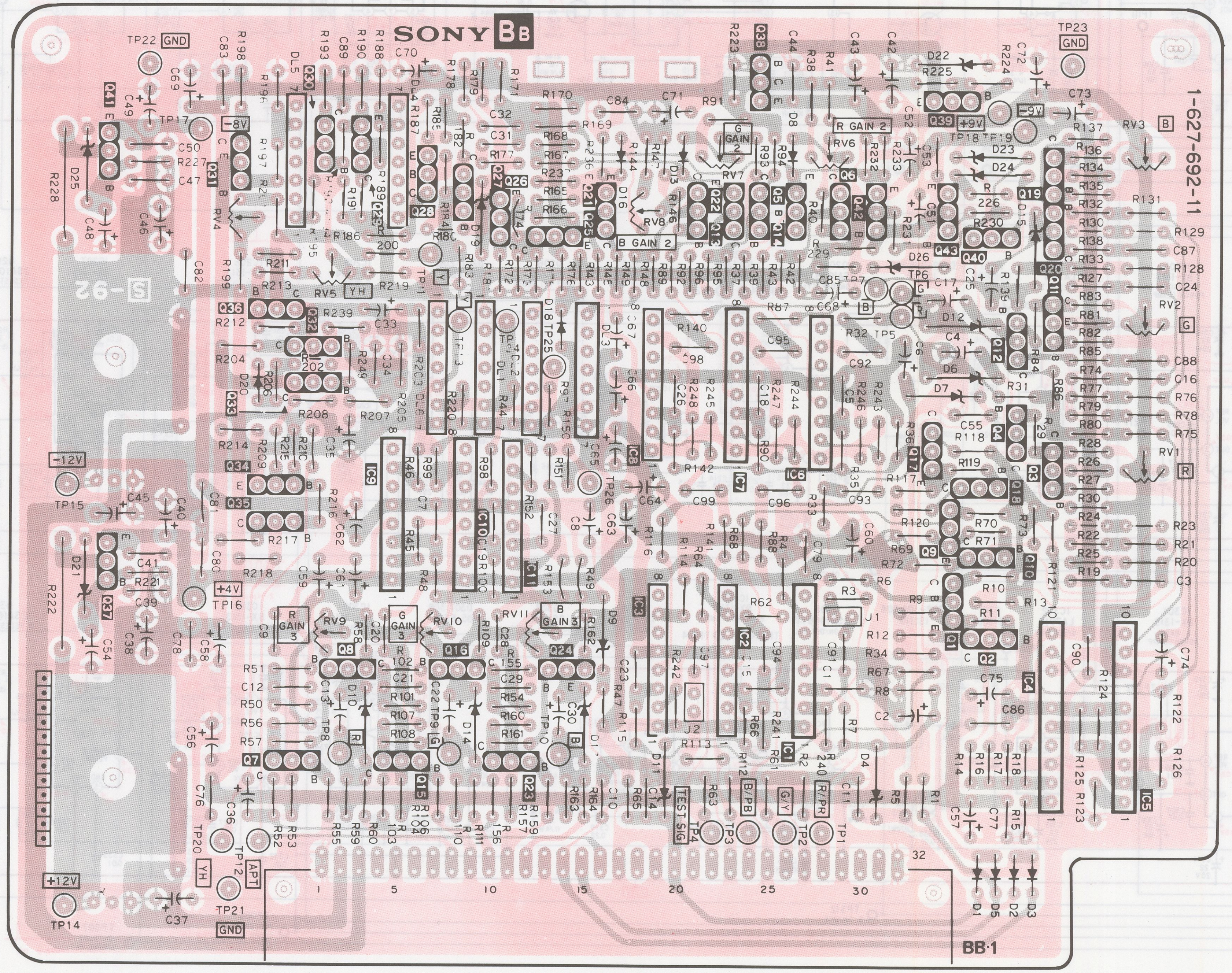
IC1	LA7016	VIDEO SW
2	LA7016	VIDEO SW
3	LA7016	VIDEO SW
4	BX-1190	VIDEO INVERTER
5	BX-1190	VIDEO INVERTER
6	LA7016	VIDEO SW
7	LA7016	VIDEO SW
8	LA7016	VIDEO SW
9	LA7016	VIDEO SW
10	LA7016	VIDEO SW
11	LA7016	VIDEO SW
Q1	2SA1206	VIDEO BUFF
2	2SC2570A	VIDEO BUFF
3	2SC2570A	VIDEO MIX AMP
4	2SC2570A	VIDEO BUFF
5	2SA1206	VIDEO BUFF
6	2SC2570A	VIDEO BUFF
7	2SC2570A	VIDEO MIX AMP
8	2SC2570A	VIDEO BUFF
9	2SA1206	VIDEO BUFF
10	2SC2570A	VIDEO BUFF
11	2SC2570A	VIDEO MIX AMP
12	2SC2570A	VIDEO BUFF
13	2SA1206	VIDEO BUFF
14	2SC2570A	VIDEO BUFF
15	2SC2570A	VIDEO MIX AMP
16	2SC2570A	VIDEO BUFF
17	2SA1206	VIDEO BUFF
18	2SC2570A	VIDEO BUFF
19	2SC2570A	VIDEO MIX AMP
20	2SC2570A	VIDEO BUFF
21	2SA1206	VIDEO BUFF
22	2SC2570A	VIDEO BUFF
23	2SC2570A	VIDEO MIX AMP
24	2SC2570A	VIDEO BUFF
25	2SA1206	VIDEO MIX AMP
26	2SA1206	VIDEO BUFF
27	2SC2570A	VIDEO BUFF
28	2SA1206	VIDEO BUFF
29	2SA1206	VIDEO BUFF
Q30	2SC2570A	VIDEO BUFF
31	2SC2570A	VIDEO BUFF
32	2SC2570A	GAIN CONTROL
33	2SC2570A	GAIN CONTROL
34	2SA1206	VIDEO AMP
35	2SC2570A	VIDEO BUFF
36	2SC2570A	VIDEO MIX AMP
37	2SD788	+4V REG
38	2SD788	+9V REG
39	2SA1175	DC SW
40	2SC2785	DC SW
41	2SB739	-8V REG
42	2SB739	-9V REG
43	2SA1175	DC SW
D1	1SS119	
2	1SS119	
3	1SS119	
4	RD15EB2	
5	1SS119	
6	RD6.2EB1	
7	RD15EB2	
8	1SS119	
9	RD15EB2	
10	RD9.1EB1	
11	RD15EB2	
12	RD6.2EB1	
13	1SS119	
14	RD9.1EB1	
15	RD6.2EB1	
16	1SS119	
17	RD9.1EB1	
18	1SS119	
19	RD9.1EB1	
20	1SS119	
21	RD4.7EB2	+4V REG
22	RD10EB2	+9V REG
23	RD11EB2	
24	RD5.6EB2	
25	RD9.1EB1	-8V REG
26	RD10EB2	-8V REG

BB board (YPBPR MATRIX, APERTURE CONTROL)


BB-1
GND
+12V
-12V
GND
GND
RED OUT
GND
GREEN OUT
GND
BLUE OUT
GND
COLOR/B&W
RGB/Y.PB PR
APERTURE
GND
GND
INPUT/TEST
GND
TEST VIDEO
GND
BLUE/PB IN
GND
GREEN/Y IN
GND
RED/PR IN
GND
GND
(TO BN-2)
TP4 TEST VIDEO
TP1 R/PR
TP2 G/Y
TP3 B/PB
TP14 +12V
TP15 -12V
TP16 +4V
TP17 -8V
TP18 +9V
TP19 -9V
TP21-23 GND
TP12 APERTURE
TP13
TP8 R OUT
TP9 G OUT
TP10 B OUT
Q37 2SD788 +4V REG
D21 RD4.7E-B2 +4V RECT
D22 RD10E-B2 +9V RECT
Q38 2SD788 +9V REG
Q39 2SA1175 DC SW
Q40 2SC2785 DC SW
D23 RD11E-B2
D24 RD5.6E-B2
D18 1SS119
Q25 2SA1206 VIDEO MIX AMP
D19 RD9.1E-B1
Q26,28 2SA1206 VIDEO BUFF
Q27 2SC2570A VIDEO BUFF
Q29 2SA1206
Q30 2SC2570A VIDEO BUFF
Q31 2SC2570A VIDEO BUFF
Q32,33 2SC2570A GAIN CONTROL
D20 1SS119
Q36 2SC2570A VIDEO MIX AMP
Q34 2SA1206 VIDEO AMP
Q35 2SC2570A VIDEO BUFF
Q41 2SB739 -8V REG
D25 RD9.1E-B1 -8V RECT
D26 RD10E-B2 -8V RECT
Q42 2SB739 -8V REG
Q43 2SA1175 DC SW
APERTURE 1
APERTURE 2
D1-3,5 1SS119
D4 RD15E-B2
IC1 LA7016 VIDEO SW
Q1 2SA1206
Q2 2SC2570A VIDEO BUFF
IC4 BX1190 VIDEO INVERTER
Q3 2SC2570A VIDEO MIX AMP
Q4 2SC2570A VIDEO BUFF
D6 RD6.2E-B1
IC6 LA7016 VIDEO SW
D7 RD15E-B2
Q5 2SA1206 VIDEO BUFF
D8 1SS119
Q6 2SC2570A VIDEO BUFF
IC9 LA7016 VIDEO SW
D9 RD15E-B2
Q7 2SC2570A VIDEO MIX AMP
Q8 2SC2570A VIDEO BUFF
D10 RD9.1E-B1
R GAIN
IC2 LA7016 VIDEO SW
D11 RD15E-B2
Q9 2SA1206
Q10 2SC2570A VIDEO BUFF
Q11 2SC2570A VIDEO MIX AMP
Q12 2SC2570A VIDEO BUFF
D12 RD6.2E-B1
IC7 LA7016 VIDEO SW
D13 1SS119
Q13 2SA1206
Q14 2SC2570A VIDEO BUFF
IC10 LA7016 VIDEO SW
Q15 2SC2570A VIDEO MIX AMP
Q16 2SC2570A VIDEO BUFF
D14 RD9.1E-B1
G GAIN
IC3 LA7016 VIDEO SW
Q17 2SA1206
Q18 2SC2570A VIDEO BUFF
IC5 BX1190 VIDEO INVERTER
Q19 2SC2570A VIDEO MIX AMP
Q20 2SC2570A VIDEO BUFF
D15 RD6.2E-B1
IC8 LA7016 VIDEO SW
D16 1SS119
Q21 2SA1206
Q22 2SC2570A VIDEO BUFF
IC11 LA7016 VIDEO SW
Q23 2SC2570A VIDEO MIX AMP
Q24 2SC2570A VIDEO BUFF
D17 RD9.1E-B1
B GAIN
DL-1
DL-2
DL-3
DL-4
DL-5
DL-6
+12V
-12V
+4V
-8V
-9V
+9V
BB
(VIDEO/DC SW, Y PB PR/RGB /Y MATRIX)

BB board (YPBPR MATRIX, APERTURE CONTROL)

IC	9, 10, 11, 8, 3, 7, 2, 6, 1, 4, 5
Q	41, 37, 31, 36, 34, 35, 7, 30, 32, 33, 8, 29, 15, 28, 27, 16, 26, 23, 25, 24, 21, 38, 22,13,5, 14, 6, 42, 39, 17, 43, 9, 1, 40, 12, 18, 10, 2, 4, 19, 20, 11, 3
D	25, 21, 20, 10, 19, 14, 18, 17, 9, 16, 11, 13, 8, 4, 26, 22,23, 6, 7, 24, 12, 1, 5, 2, 3, 15
ADJ TP	TP15, TP14, TP22, TP17, TP16, TP20, TP21, RV4, TP12, RV5, TP8, TP11,TP13, TP9, TP24, TP25, TP10, TP26, TP4,TP3,TP2,TP1, TP6, TP5, TP7, TP18, TP23, TP19, RV3, RV2, RV1

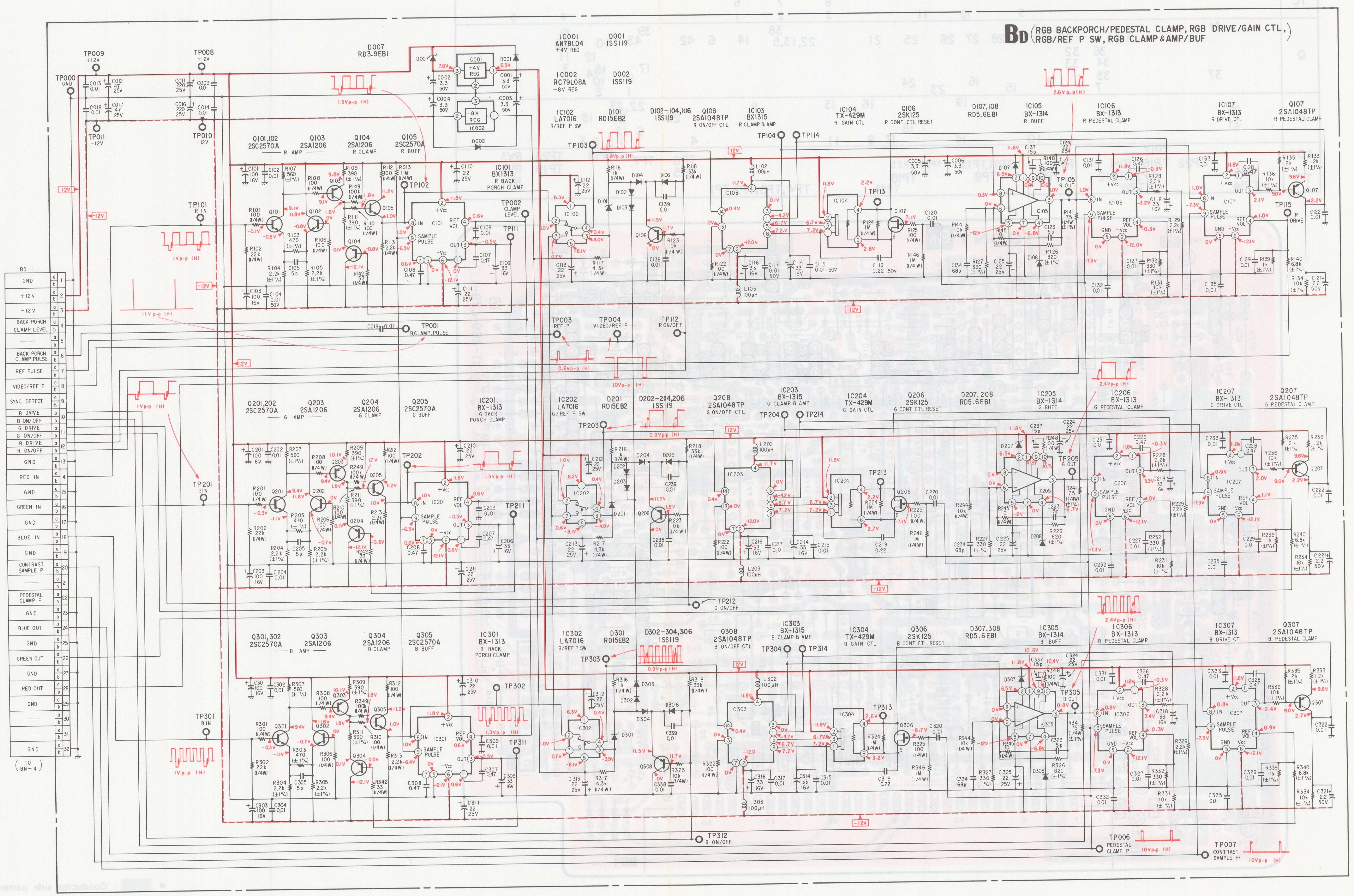

SONY BB
1-627-692-11
BB-1
TP22 GND
TP23 GND
GND
-12V
+12V
+4V
-8V
+9V
-9V
1
5
10
15
20
25
30
32

- ▒ : Conductor side pattern
- 🟥 : Component side pattern

BD board

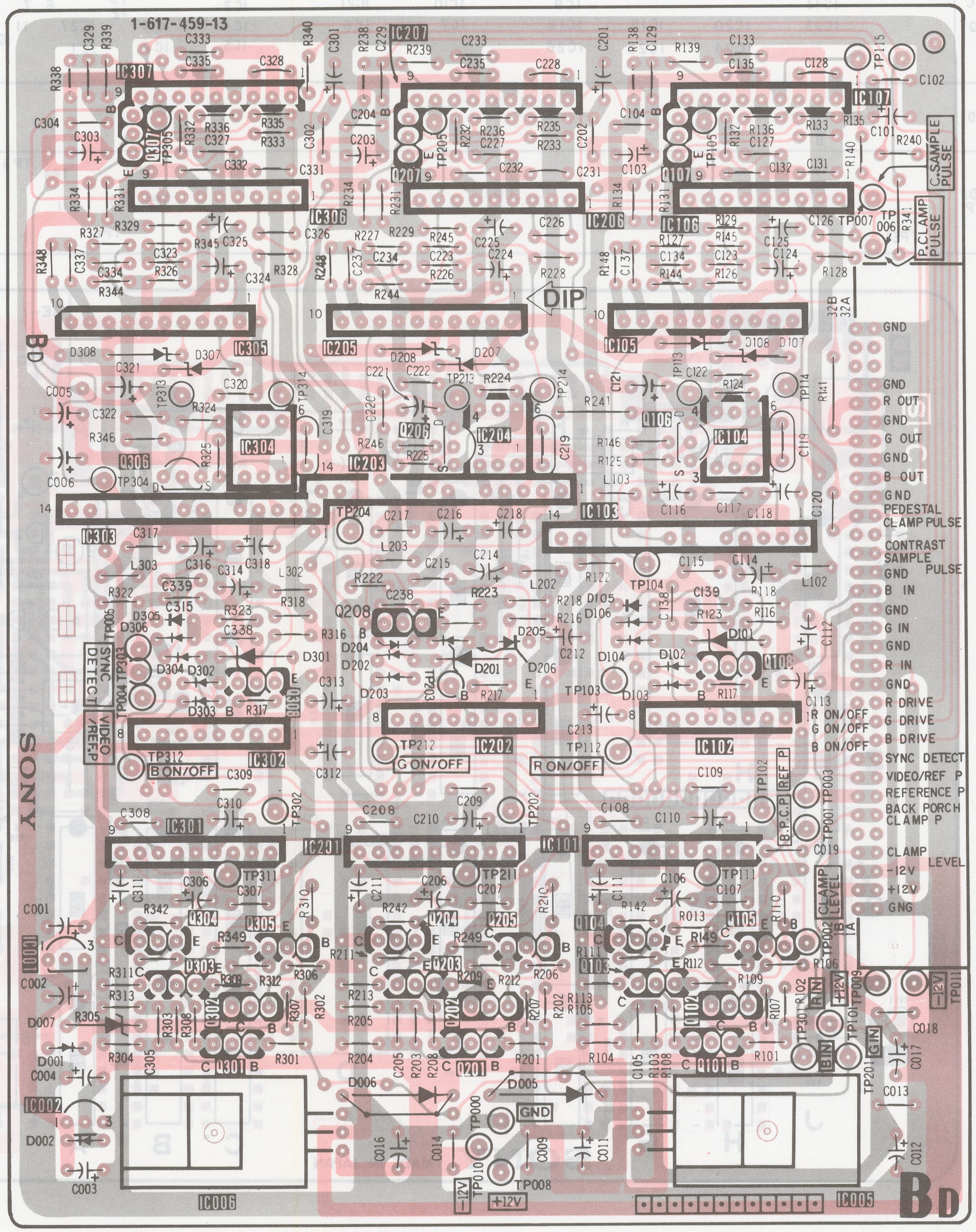
IC001	AN78L04	+4V REG
002	RC79L08A	-8V REG
101	BX-1313	R BACKPORCH CLAMP
102	LA7016	R/REF P SW
103	BX-1315	R CLAMP & AMP
104	TX-429M	R GAIN CTL
105	BX-1314	R BUFF
106	BX-1313	R PEDESTAL CLAMP
107	BX-1313	R DRIVE CTL
201	BX-1313	G BACKPORCH CLAMP
202	LA7016	G/REF P SW
203	BX-1315	G CLAMP & AMP
204	TX-429M	G GAIN CTL
205	BX-1314	G BUFF
206	BX-1313	G PEDESTAL CLAMP
207	BX-1313	G DRIVE CTL
301	BX-1313	B BACKPORCH CLAMP
302	LA7016	B/REF P SW
303	BX-1315	B CLAMP & AMP
304	TX-429M	B GAIN CTL
305	BX-1314	B BUFF
306	BX-1313	B PEDESTAL CLAMP
307	BX-1313	B DRIVE CTL
Q101	2SC2570A	R AMP
102	2SC2570A	R AMP
103	2SA1206	R AMP
104	2SA1206	R CLAMP
105	2SC2570A	R BUFF
106	2SK125	R CONT CTL RESET
107	2SA1048	R PEDESTAL CLAMP
108	2SA1048	R ON/OFF CTL
201	2SC2570A	G AMP
202	2SC2570A	G AMP
203	2SA1206	G AMP
204	2SA1206	G CLAMP
205	2SC2570A	G CLAMP
206	2SK125	G CONT CTL RESET
Q207	2SA1048	G PEDESTAL CLAMP
208	2SA1048	G ON/OFF CTL
301	2SC2570A	B AMP
302	2SC2570A	B AMP
303	2SA1206	B AMP
304	2SA1206	B CLAMP
305	2SC2570A	B CLAMP
306	2SK125	B CONT CTL RESET
307	2SA1048	B PEDESTAL CLAMP
308	2SA1048	B ON/OFF CTL
D001	1SS119	
002	1SS119	
007	RD3.9EB1	
101	RD15EB2	
102	1SS119	
103	1SS119	
104	1SS119	
106	1SS119	
107	RD5.6EB1	
108	RD5.6EB1	
201	RD15EB2	
202	1SS119	
203	1SS119	
204	1SS119	
206	1SS119	
207	RD5.6EB1	
208	RD5.6EB1	
301	RD15EB2	
302	1SS119	
303	1SS119	
304	1SS119	
306	1SS119	
307	RD5.6EB1	
308	RD5.6EB1	

BD board (CONTRAST/GAIN CONTROL)


BD (RGB BACKPORCH/PEDESTAL CLAMP, RGB DRIVE/GAIN CTL, RGB/REF P SW, RGB CLAMP & AMP/BUF)
BD-1
GND
+12V
-12V
BACK PORCH CLAMP LEVEL
BACK PORCH CLAMP PULSE
REF PULSE
VIDEO/REF P
SYNC DETECT
B DRIVE
B ON/OFF
G DRIVE
G ON/OFF
R DRIVE
R ON/OFF
RED IN
GREEN IN
BLUE IN
CONTRAST SAMPLE P
PEDESTAL CLAMP P
BLUE OUT
GREEN OUT
RED OUT
(TO BN-4)
TP000
TP009
TP008
TP010
TP011
TP001
TP003
TP004
TP006 PEDESTAL CLAMP P
TP007 CONTRAST SAMPLE P
TP101
TP201
TP301
IC001 AN78L04 +4V REG
IC002 RC79L08A -8V REG
D001 1SS119
D002 1SS119
D007 RD3.9EB1
2.6Vp-p (H)
1Vp-p (H)
Component side pattern
Conductor side pattern

BD board (CONTRAST/GAIN CONTROL)

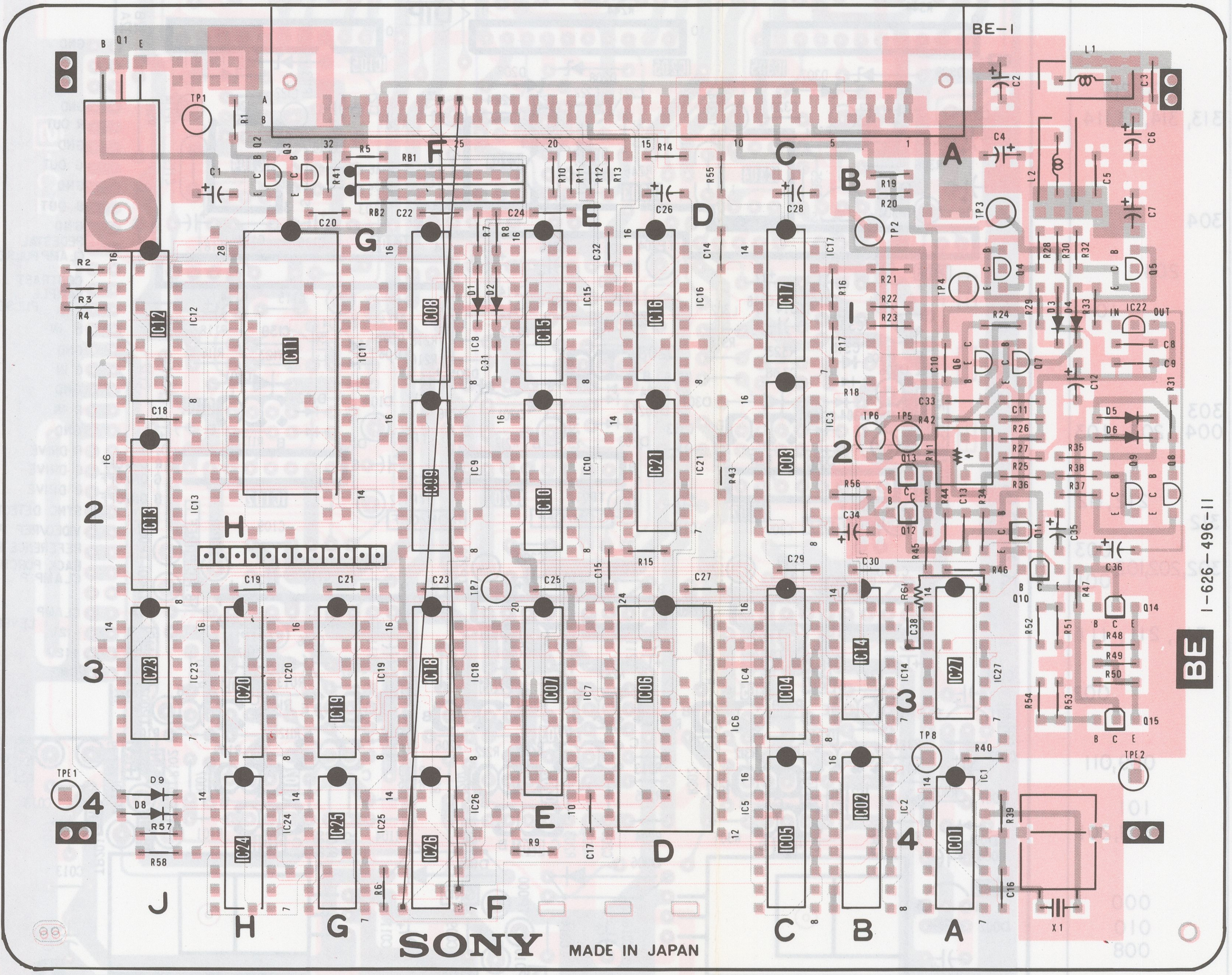
IC	Q	D	TP
			115
307 207 107			305 205 105
	307 207 107		
			007
306 206 106			
			006
305 205 105			
		308 208 108	213, 214
		307 207 107	313, 314,113,114
304 204 104	206, 106		
203	306		304
303			
103			204
			104
		204,106	
	208	306,202,104 101	
		304, 301, 201	
		302 102	303
	308 108	303,203 103	004 203 103
		206	
202 102			
302			212,112
			312
			003
			302,202,102
			001
301 201 101			
			311, 211, 111
	204,205		002
	304,305,104,105		
001			
	303 203 103		009,011
	302,202,102	007	101
	301, 201,101		
		001	301,201
			000
002		002	010
			008


1-617-459-13
DIP
BD
SONY
IC307
IC207
IC107
IC306
IC206
IC106
IC305
IC205
IC105
IC304
IC204
IC104
IC303
IC203
IC103
IC302
IC202
IC102
IC301
IC201
IC101
IC001
IC002
IC005
IC006
C.SAMPLE PULSE
P.CLAMP PULSE
SYNC DETECT
VIDEO REF.P
B ON/OFF
G ON/OFF
R ON/OFF
B.P.C.P
REF P
CLAMP LEVEL
GND
R OUT
G OUT
B OUT
PEDESTAL CLAMP PULSE
CONTRAST SAMPLE PULSE
B IN
G IN
R IN
R DRIVE
G DRIVE
B DRIVE
R ON/OFF
G ON/OFF
B ON/OFF
SYNC DETECT
VIDEO/REF P
REFERENCE P
BACK PORCH CLAMP P
CLAMP LEVEL
-12V
+12V
GNG
R IN
G IN
B IN
-12V
+12V
GND

- ▨ : Conductor side pattern
- 🟥 : Component side pattern

BE board (BUILT-IN SIGNAL GENERATOR)

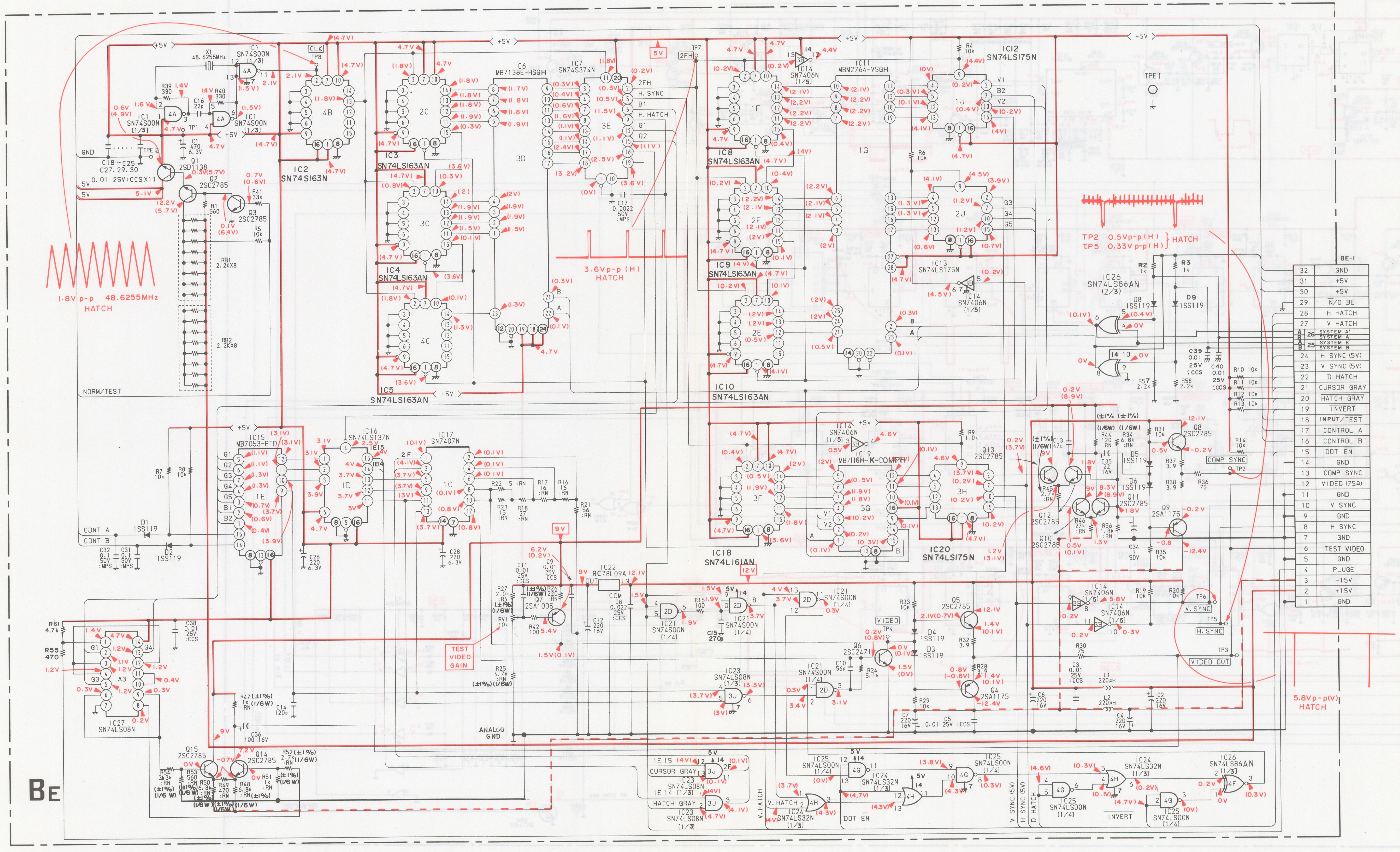
IC Q	1 IC12 IC13 IC23	2 3 IC11 IC20 IC24	IC19 IC25	IC8 IC9 IC18 IC26	IC15 IC10 IC7	IC16 IC21 IC6	IC17 IC3 IC4 IC5	13 12 IC14 IC2	4 6 7 IC27 11 IC1 10	5 IC22 9 8 14 15
D	9 8			1 2					3 4	5 6
ADJ TP	TPE1	TP1		TP7				TP2 TP6 TP5 TP8	TP3 TP4 RV1	TPE2


BE-1
1
2
3
4
A B C D E F G H J
SONY
MADE IN JAPAN
BE
1-626-496-11
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TPE1
TPE2
X1
L1
L2

● ▨ : Conductor side pattern

● 🟥 : Component side pattern

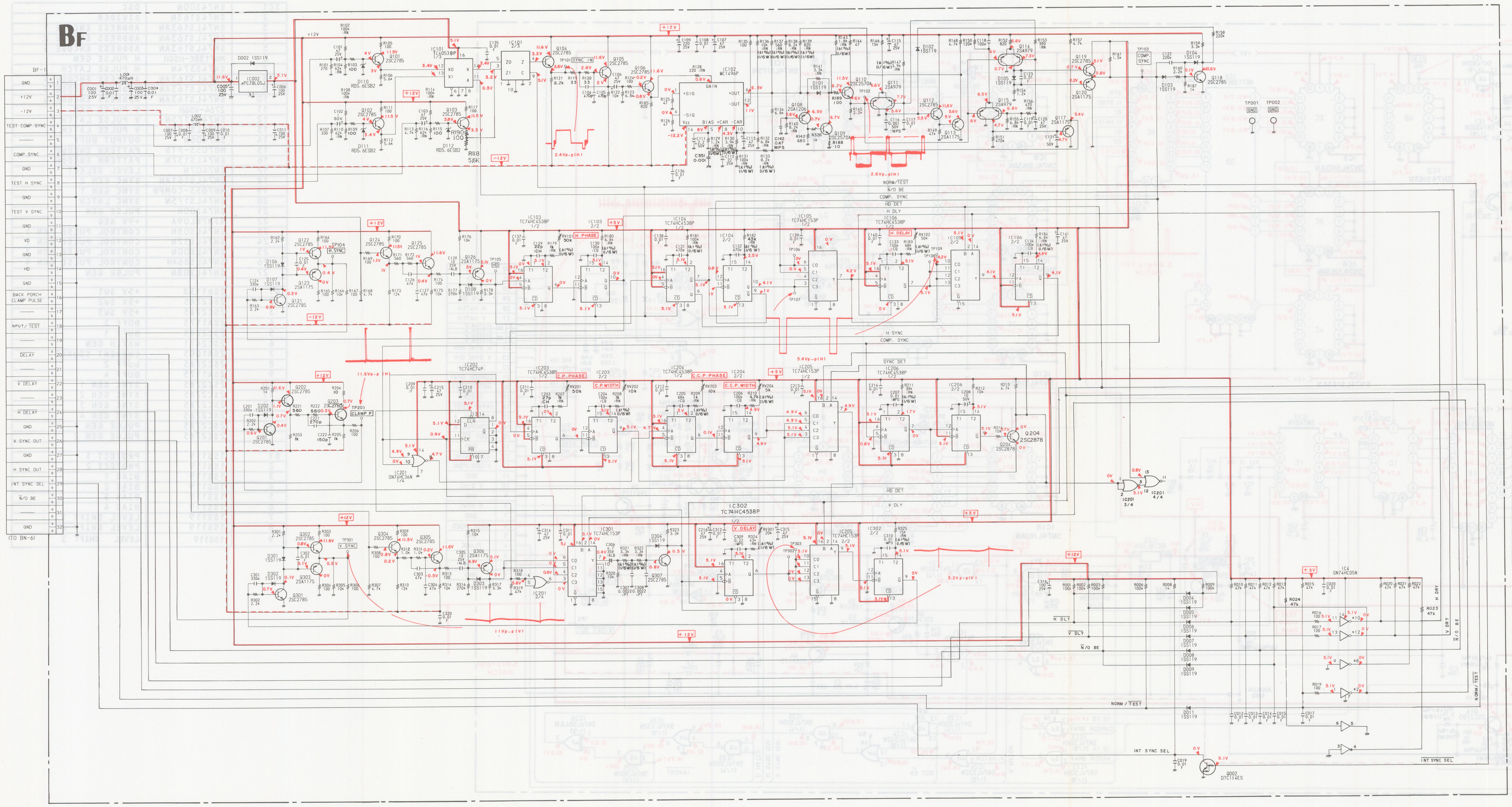
BE board (BUILT-IN SIGNAL GENERATOR)


IC1 SN74S00N
X1 48.6255MHz
IC2 SN74S163N
IC3 SN74LS163AN
IC4 SN74LS163AN
IC5 SN74LS163AN
IC6 MB7138E-HSGH
IC7 SN74S374N
IC8 SN74LS163AN
IC9 SN74LS163AN
IC10 SN74LS163AN
IC11 MBM2764-VSGH
IC12 SN74LS175N
IC13 SN74LS175N
IC14 SN7406N
IC15 MB7053-PTD
IC16 SN74LS137N
IC17 SN7407N
IC18 SN74LS161AN
IC19 MB7106H-K-COMPB
IC20 SN74LS175N
IC21 SN74S00N
IC22 RC78L09A
IC23 SN74LS08N
IC24 SN74LS32N
IC25 SN74LS00N
IC26 SN74LS86AN
IC27 SN74LS08N
1.8V p-p 48.6255MHz HATCH
3.6Vp-p (H) HATCH
TP2 0.5Vp-p (H) HATCH
TP5 0.33Vp-p (H)
5.8Vp-p (V) HATCH
TEST VIDEO GAIN
ANALOG GND
NORM/TEST
CONT A
CONT B
BE-1
BE

BE board

IC1	SN74S00N	OSC
2	SN74S163N	DIVIDER
3	SN74LS163AN	ADDRESS ENCODE 1
4	SN74LS163AN	ADDRESS ENCODE 2
5	SN74LS163AN	ADDRESS ENCODE 3
6	MB7138E-HSGH	H PULSE GEN
7	SN74S374N	H PULSE LATCH
8	SN74LS163AN	ADDRESS ENCODE 4
9	SN74LS163AN	ADDRESS ENCODE 5
10	SN74LS163AN	ADDRESS ENCODE 6
11	2764-VSGH	V PULSE GEN
12	SN74LS175N	V PULSE LATCH 1
13	SN74LS175N	V PULSE LATCH 2
14	SN7406N	OUTPUT BUFF
15	MB7053-PTD	PATTERN ENCODE
16	SN74LS137N	PATTERN ENCODE
17	SN7407N	LEVEL SELECT
18	SN74LS161AN	SYNC GEN 2
19	MB7053-COMPB	SYNC GEN 1
20	SN74LS175N	SYNC LATCH
21	SN74S00N	PULSE GEN
22	NJM78L09A	+9V REG
23	SN74LS08N	CONTROL PULSE GEN 1
24	SN74LS32N	CONTROL PULSE GEN 2
25	SN74LS00N	CONTROL PULSE GEN 3
26	SN74LS86AN	CONTROL PULSE GEN 4
27	SN74LS08N	PULGE GEN
Q1	2SD1138	+5V SW1
2	2SC2785	+5V SW2
3	2SC2785	+5V SW3
4	2SA1175	BUFF 3
5	2SC2785	BUFF 1
6	2SC2471	HATCH GEN
7	2SA1005	CURRENT SOURCE
8	2SC2785	BUFF 2
9	2SA1175	BUFF 4
10	2SC2785	SYNC GEN 1
11	2SC2785	SYNC GEN 2
12	2SC2785	SYNC GEN 3
13	2SC2785	SYNC GEN 4
14	2SC2785	PULGE GEN 1
15	2SC2785	PULGE GEN 2
D1	1SS119	PROTECT 1
2	1SS119	PROTECT 2
3	1SS119	BIAS 1
4	1SS119	BIAS 2
5	1SS119	BIAS 3
6	1SS119	BIAS 4
7	1SS119	LEVEL SHIFT 1
8	1SS119	LEVEL SHIFT 2
9	1SS119	LEVEL SHIFT 3

BF board (SYNC PROCESSOR)

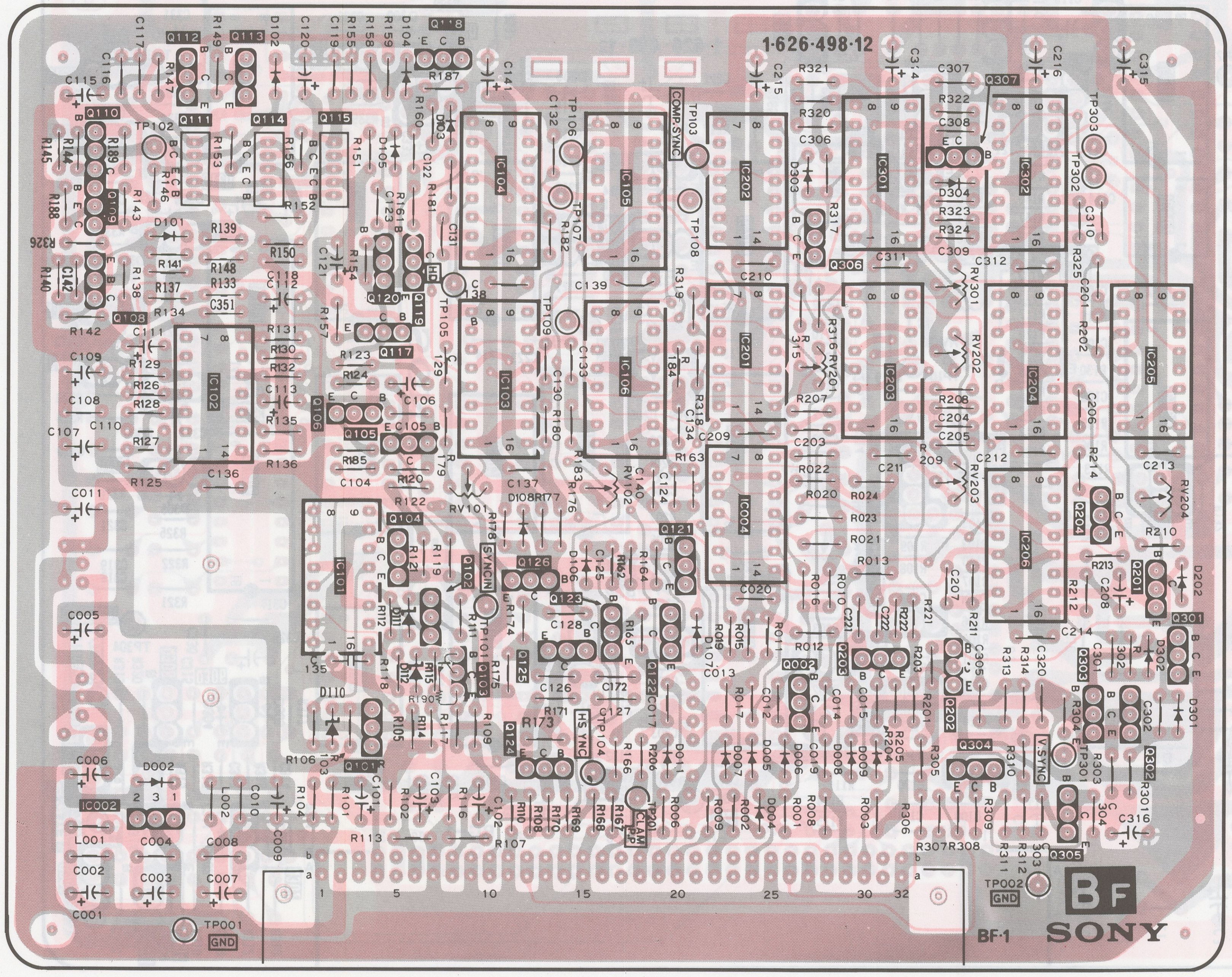

BF
BF-1
GND 1
+12V 2
-12V 3
TEST COMP SYNC 4
5
COMP SYNC 6
GND 7
TEST H SYNC 8
GND 9
TEST V SYNC 10
GND 11
VD 12
GND 13
HD 14
GND 15
BACK PORCH CLAMP PULSE 16
17
INPUT/TEST 18
19
DELAY 20
21
V DELAY 22
23
H DELAY 24
GND 25
V SYNC OUT 26
GND 27
H SYNC OUT 28
INT SYNC SEL 29
N/O BE 30
31
GND 32
(TO BN-6)
C001 100 25V
C002 0.01 F
IC002 μPC78L05J
IC101 TC74HC4538P
IC102 MC1496P
IC103 TC74HC4538P
IC104
IC105 TC74HC153P
IC106 TC74HC4538P
IC201 SN74LS14N
IC202 TC74HC74P
IC203 TC74HC4538P
IC204 TC74HC4538P
IC205 TC74HC153P
IC206 TC74HC4538P
IC301 TC74HC153P
IC302 TC74HC4538P
IC4 SN74HC05N
Q204 2SC2878
Q002 DTC114ES
H SYNC
CLAMP P
V SYNC
H PHASE
H DELAY
C.P. PHASE
C.P. WIDTH
V DELAY
NORM/TEST
N/O BE
COMP. SYNC
HD DET
H DLY
SYNC DET
V DLY
INT SYNC SEL
+12V
-12V
+5V
2.4Vp-p(H)
2.4Vp-p(H)
5.4Vp-p(H)
11.6Vp-p(H)
11Vp-p(V)
5.2Vp-p(V)
TP001
TP002
TP101
TP102
TP103 COMP SYNC
TP104
TP105
TP106
TP107
TP201 CLAMP P
TP301 V SYNC
TP303

BF board

IC2	UPC78L05J	5V REG
4	SN74HC05N	INVERTER
101	TC4053BP	INPUT/TEST SW
102	MC1496P	GAIN CONTROL
103	TC74HC4538P	HD DELAY
104	TC74HC4538P	COMPARATOR
105	TC74HC153P	H SYNC SW
106	TC74HC4538P	CLAMP PULSE GEN
201	SN74HC36N	NAND GATE
202	MC74HC74N	COMP SYNC
203	TC74HC4538P	HD DELAY
204	TC74HC4538P	COMPARATOR
205	TC74HC153P	CLAMP PULSE GEN
206	TC74HC4538P	V SYNC
301	TC74HC153P	V SYNC SW
302	TC74HC4538P	CLAMP PULSE GEN & COMPARATOR
Q2	DTC114ES	INVERTER
101	2SC2785	BUFF
102	2SC2785	BUFF
103	2SC2785	BUFF
104	2SC2785	BUFF
105	2SC2785	BUFF
106	2SC2785	BUFF
108	2SA1206-K1	SYNC AMP
109	2SC2570A	SYNC AMP
110	2SC2570A	SYNC AMP
111	2SA979	COMPARATOR
112	2SC2785	BUFF
113	2SA1175	BUFF
114	2SA979	EQUIVALENT PULSE ELIM
115	2SA979	H/V SYNC GEN
117	2SA1175	H/V SYNC DELAY
118	2SC2785	V SYNC SEP
119	2SC2785	BUFF
120	2SA1175	BUFF
121	2SC2785	BUFF
122	2SC2785	BUFF
123	2SA1175	BUFF
124	2SC2785	HD AMP
125	2SC2785	HD AMP
126	2SA1175	HD AMP
201	2SC2785	BUFF
202	2SC2785	BUFF
203	2SC2785	BUFF
204	2SC2878	BUFF
301	2SC2785	BUFF
302	2SC2785	BUFF
303	2SA1175	BUFF
304	2SC2785	VD AMP
305	2SC2785	VD AMP
306	2SA1175	VD AMP
307	2SC2785	BUFF
D2	1SS119	
4	1SS119	
5	1SS119	
6	1SS119	
7	1SS119	
8	1SS119	
9	1SS119	
11	1SS119	
101	1SS119	
102	1SS119	
103	1SS119	
104	1SS119	
105	1SS119	
106	1SS119	
107	1SS119	
108	1SS119	
110	RD5.6ES-B2	
111	RD5.6ES-B2	
112	RD5.6ES-B2	
202	1SS119	
301	1SS119	
302	1SS119	
303	1SS119	
304	1SS119	

BF board (SYNC PROCESSOR)

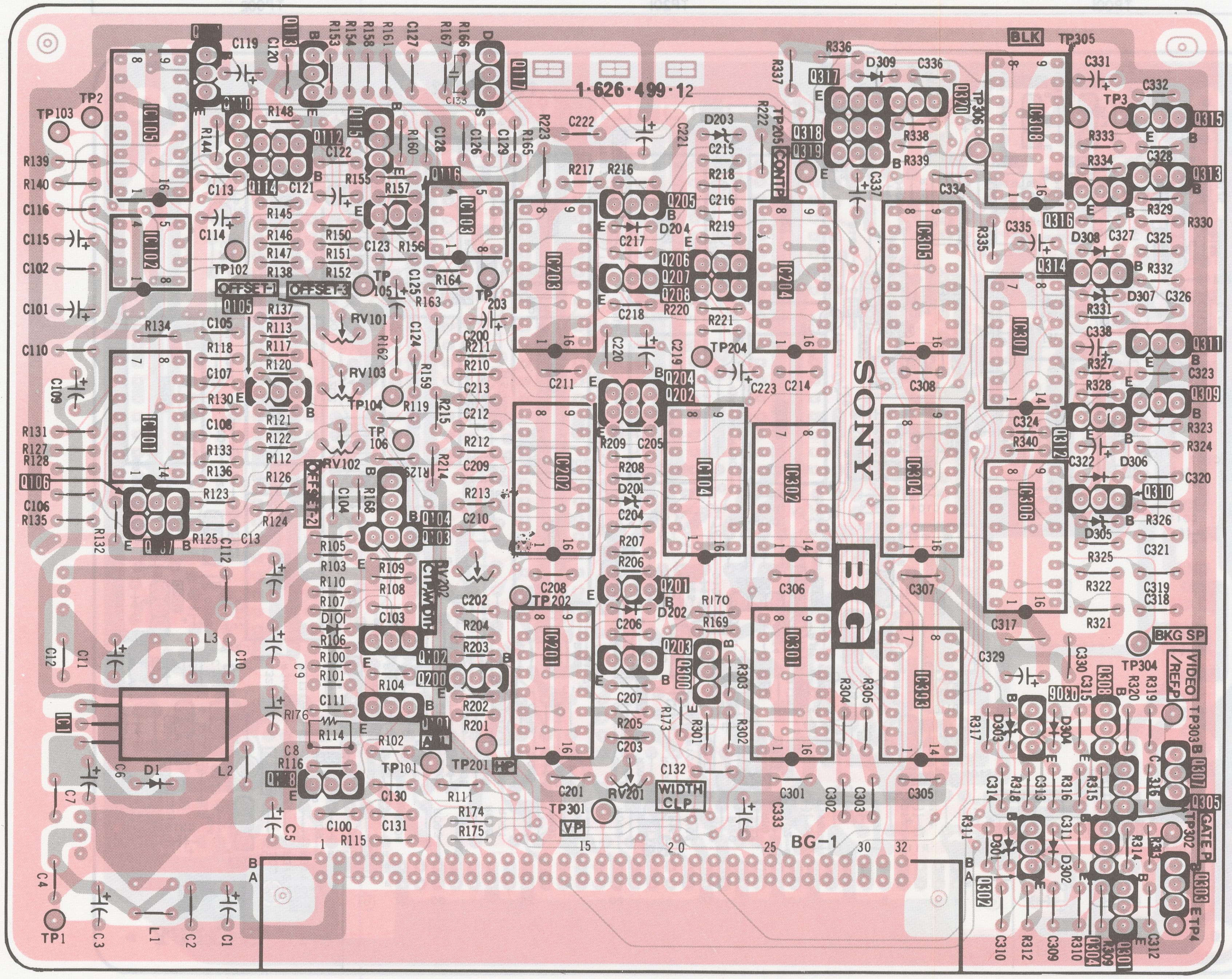
IC	002 102 101 104 103 105 106 202 201 004 301 203 302 204 206 205
Q	110 109 108 112 111 113 114 115 106 101 120 117 105 104,102,103 118 119 126,125 124 123 121 122 306 002 203 307 202 304 204 303 305 201 301 302
D	101 002 102 110 104 105 111 112 103 108 106 011 107 007 005 004 006 008,009 303 304 202 302 301
ADJ TP	TP102 TP001 TP105 RV101 TP101 TP106 TP107 TP109 TP104 TP201 RV102 TP103 TP108 RV201 RV301 RV202 RV203 TP303 TP302 TP301 TP002 RV204



- ● ▨ : Conductor side pattern
- ● 🟥 : Component side pattern

BG board (PULSE GENERATOR)

IC	105 102 101 103 203 202 201 104 204 302 301 305 304 303 308 307 306
Q	106 107 111 110 112 114 105 113 118 115 116 104 103 102 101 117 200 205 207 204 202 201 203 206 208 300 317 318 319 320 306 302 316 314,308 312, 305 310,304 301 315 313 311 309 307 303
D	1 101 204 201 202 203 309 303 301 304 302 308 307 305,306
RV	101 103 102 202 201
TP	103 1 2 102 105,104 106 101 203 201 202 301 204 205 306 305 3 304 303 302 4

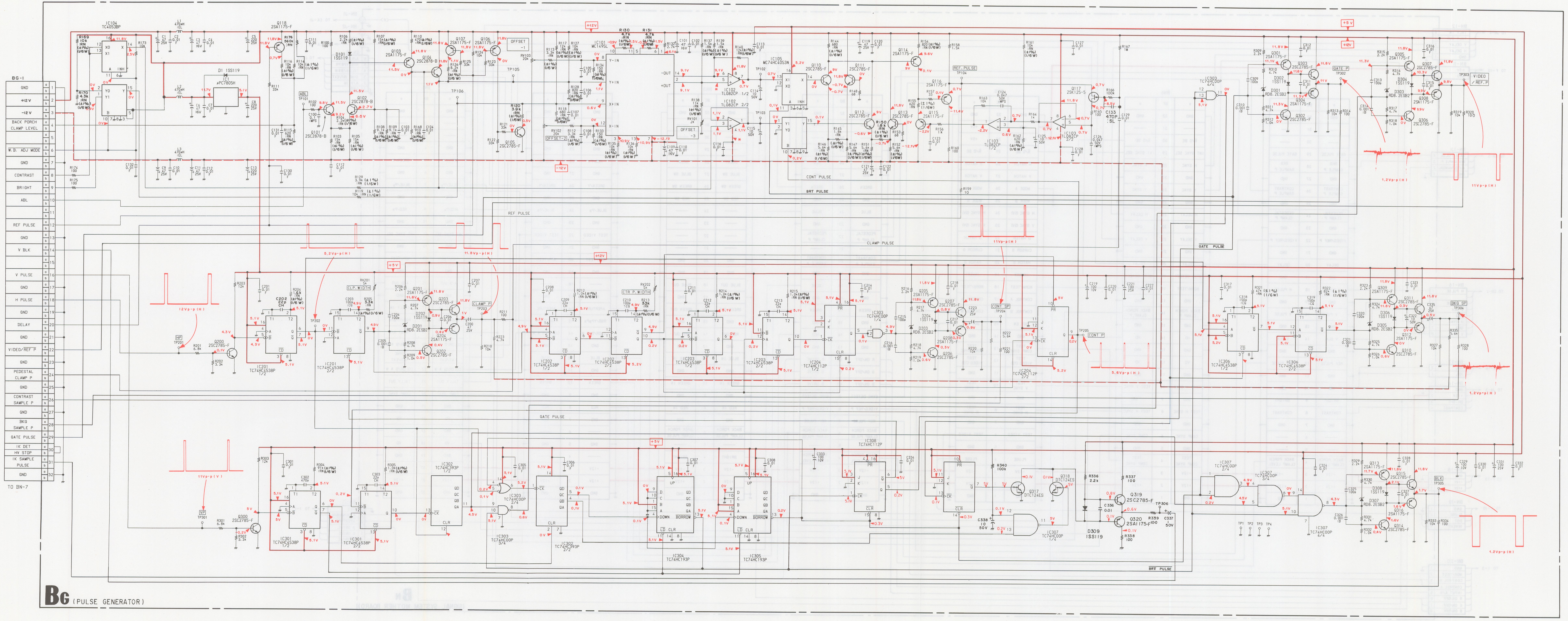


● ▨ : Conductor side pattern
● ▨ : Component side pattern

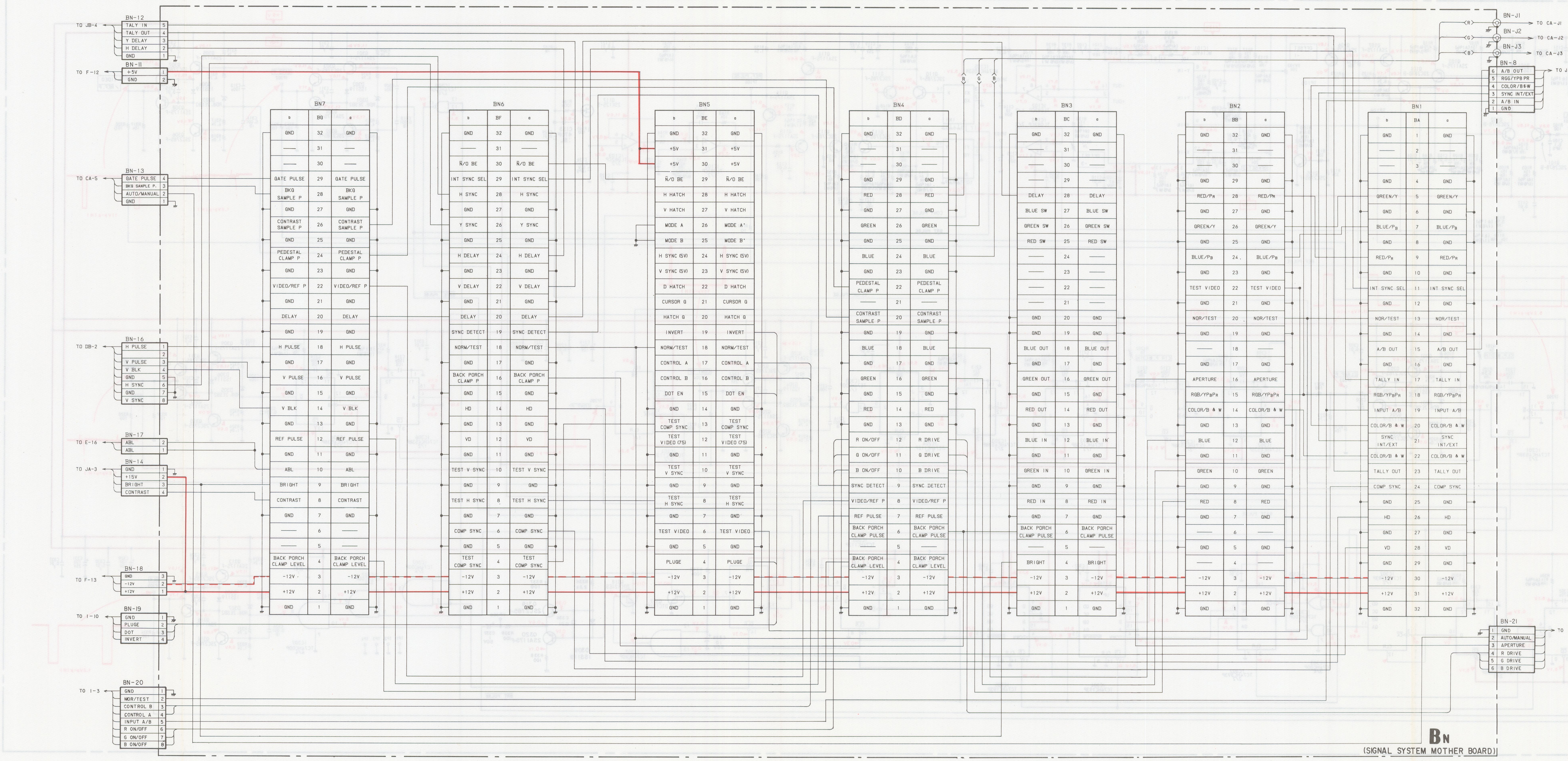
BG board

IC1	μPC7805H	5V REG
101	MC1495L	BRT P CTL
102	TL082CP	REF P GEN
103	TL082CP	REF P CLAMP
104	TC4053BP	PEDESTAL LEVEL SW
105	MC74HC4053N	REF P GEN
201	TC74HC4538P	COUNTER CLK GEN
202	TC74HC4538P	BRT P TM GEN
203	TC74HC4538P	PULSE GEN
204	TC74HC112P	CONT SAMPLE P GEN & CLAMP P GEN
301	TC74HC4538P	SAMPLE P GEN
302	TC74HC393P	BRT P GEN
303	TC74HC00P	BRT P GEN
304	TC74HC193P	BRT P GEN
305	TC74HC193P	BRT P GEN
306	TC74HC4538P	BKG SP GEN
307	TC74HC00P	BLK P GEN
308	TC74HC112P	GATE P GEN/IK DET
Q101	2SC2878	ABL
102	2SC2878	ABL
103	2SA1175	ABL
104	2SC2785	ABL
105	2SC2878	DELAY
106	2SA1175	DELAY
107	2SA1175	DELAY
110	2SC2785	REF P GEN
111	2SC2785	REF P GEN
112	2SC2785	REF P GEN
113	2SC2785	REF P GEN
114	2SA1175	REF P GEN
115	2SA1175	REF P CLAMP
116	2SA1175	REF P CLAMP
117	2SK125-5	REF P CLAMP
118	2SA1175	BACK PORCH CLAMP
200	2SC2785	HP BUFF
201	2SA1175	CLAMP P GEN
202	2SC2785	CLAMP P GEN
203	2SC2785	CLAMP P GEN
204	2SA1175	CLAMP P GEN
205	2SA1175	CONT P TIMING GEN
206	2SC2785	CONT P TIMING GEN
207	2SC2785	CONT P
208	2SA1175	CONT P
300	2SC2785	VP BUFF
301	2SA1175	BRT P TIMING GEN
302	2SC2785	BRT P TIMING GEN
303	2SC2785	BRT P TIMING GEN
304	2SA1175	BRT P TIMING GEN
305	2SA1175	VIDEO/REEP SEL CONT
306	2SC2785	VIDEO/REEP SEL CONT
307	2SC2785	VIDEO/REEP SELECTOR CONTROL
308	2SA1175	VIDEO/REEP SELECTOR CONTROL
309	2SA1175	BKG SAMPLE P GEN
310	2SC2785	BKG SAMPLE P GEN
311	2SC2785	BKG SAMPLE P GEN
312	2SA1175	BKG SAMPLE P GEN
313	2SA1175	BLK P GEN
314	2SC2785	BLK P GEN
315	2SC2785	BLK P GEN
316	2SA1175	BLK P GEN
317	DTC124ES	IK SAMPLE P GEN
318	DTC124ES	IK SAMPLE P GEN
319	2SC2785	IK SAMPLE P GEN
320	2SA1175	IK SAMPLE P GEN
D1	1SS119	
101	1SS119	
201	RD8.2ESB2	
202	RD8.2ES-B2	
203	RD8.2ES-B2	
204	1SS119	
301	RD8.2ES-B2	
302	1SS119	
303	RD8.2ES-B2	
304	1SS119	
305	RD8.2ES-B2	
306	1SS119	
307	RD8.2ES-B2	
308	1SS119	
309	1SS119	

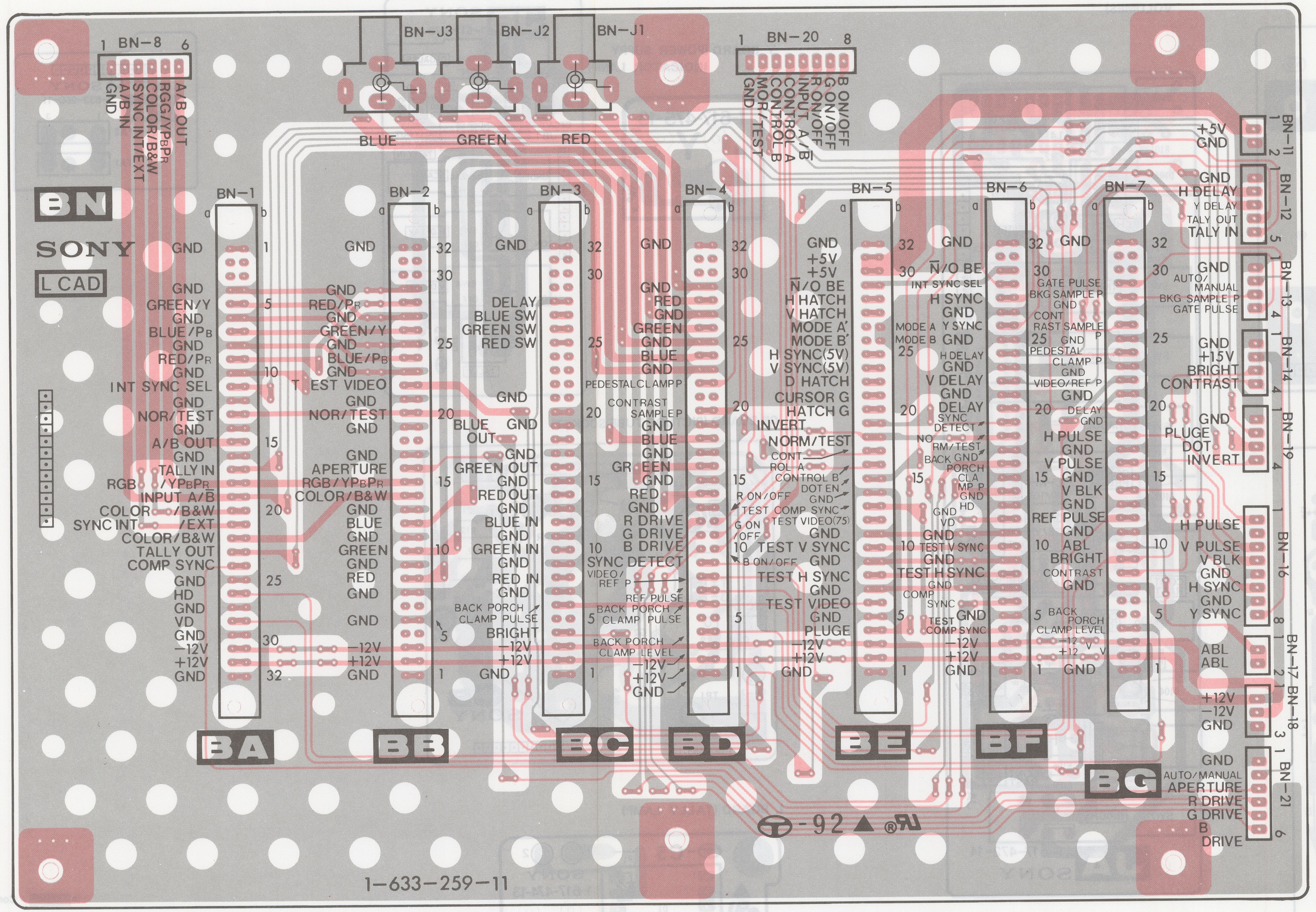
BG board (PULSE GENERATOR)


BG-1
GND
+12V
-12V
BACK PORCH CLAMP LEVEL
W.B. ADJ MODE
GND
CONTRAST
BRIGHT
ABL
REF PULSE
GND
V BLK
V PULSE
GND
H PULSE
GND
DELAY
GND
VIDEO/REF P
GND
PEDESTAL CLAMP P
GND
CONTRAST SAMPLE P
GND
BKG SAMPLE P
GATE PULSE
1K DET
HV STOP
1K SAMPLE PULSE
GND
TO BN-7
IC104 TC4053BP
IC101 MC14S0L
IC102 TL082CP
IC105 MC74HC4053N
IC103 TL082CP
IC201 TC74HC4538P
IC202 TC74HC4538P
IC203 TC74HC4538P
IC204 TC74HC112P
IC301 TC74HC4538P
IC302 TC74HC393P
IC303 TC74HC00P
IC304 TC74HC193P
IC305 TC74HC193P
IC306 TC74HC112P
IC307 TC74HC00P
CONT PULSE
BRT PULSE
REF PULSE
CLAMP PULSE
GATE PULSE
+12V
-12V
+5V
OFFSET
VIDEO/REF P
BKG SP
CONT SP
CLAMP P
CTR P WIDTH
12Vp-p(H)
11Vp-p(V)
11Vp-p(H)
5.8Vp-p(H)
1.2Vp-p(H)
Bg (PULSE GENERATOR)

BN board (SIGNAL SYSTEM MOTHER BOARD)


BN-12
TO JB-4
TALY IN 5
TALY OUT 4
Y DELAY 3
H DELAY 2
GND 1
BN-11
TO F-12
+5V 1
GND 2
BN-13
TO CA-5
GATE PULSE 4
BKG SANPLE P. 3
AUTO/MANUAL 2
GND 1
BN-16
TO DB-2
H PULSE 1
2
V PULSE 3
V BLK 4
GND 5
H SYNC 6
GND 7
V SYNC 8
BN-17
TO E-16
ABL 2
ABL 1
BN-14
TO JA-3
GND 1
+15V 2
BRIGHT 3
CONTRAST 4
BN-18
TO F-13
GND 3
-12V 2
+12V 1
BN-19
TO I-10
GND 1
PLUGE 2
DOT 3
INVERT 4
BN-20
TO I-3
GND 1
MOR/TEST 2
CONTROL B 3
CONTROL A 4
INPUT A/B 5
R ON/OFF 6
G ON/OFF 7
B ON/OFF 8
BN7
BN6
BN5
BN4
BN3
BN2
BN1
BA
a
GND
-12V
+12V
BN-J1
BN-J2
BN-J3
R
G
B
TO CA-J1
TO CA-J2
TO CA-J3
BN-8
TO JA-1
6 A/B OUT
5 RGG/YPB PR
4 COLOR/B&W
3 SYNC INT/EXT
2 A/B IN
1 GND
BN-21
TO I-1
1 GND
2 AUTO/MANUAL
3 APERTURE
4 R DRIVE
5 G DRIVE
6 B DRIVE
BN
(SIGNAL SYSTEM MOTHER BOARD)

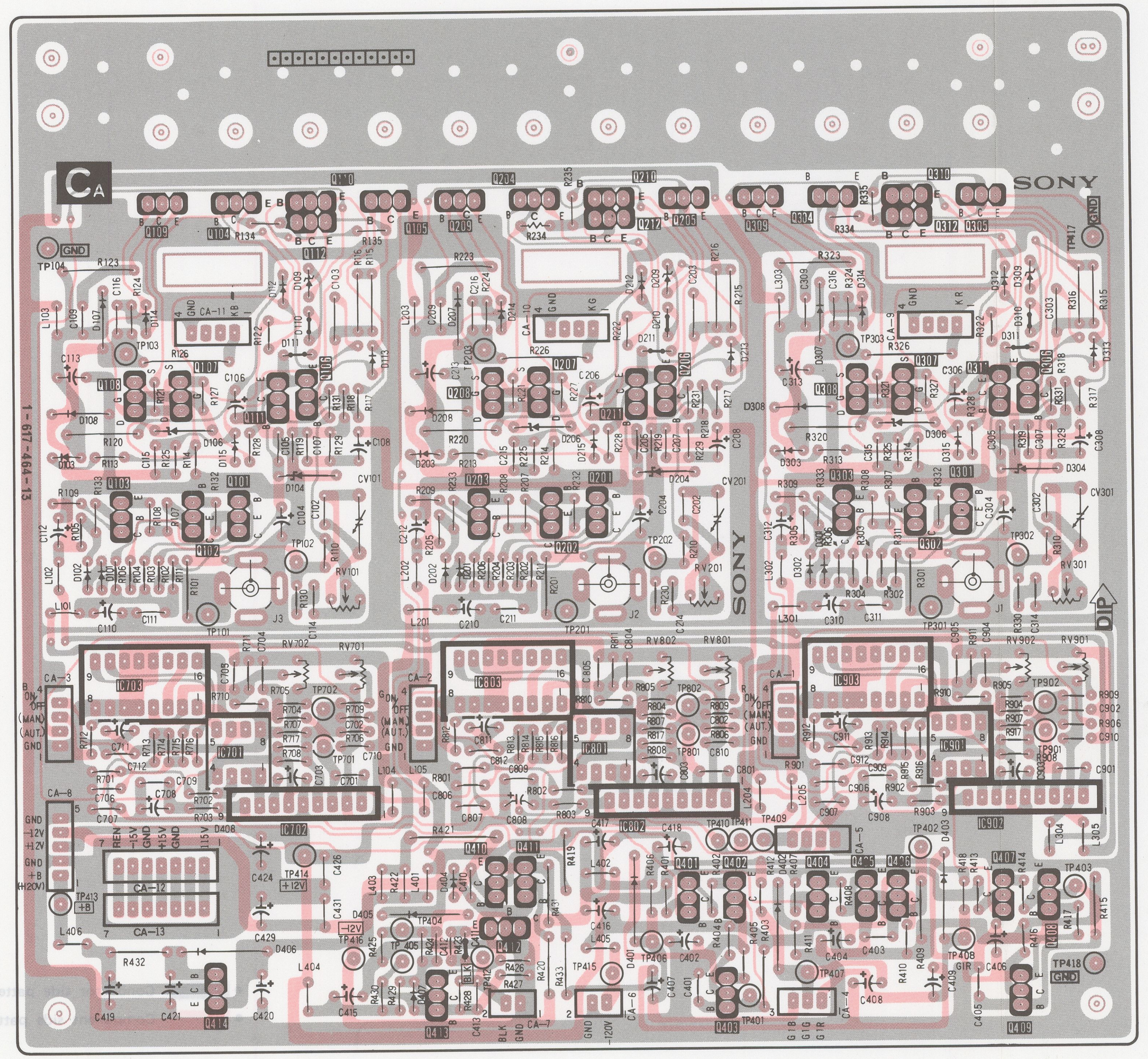
BN board (SIGNAL SYSTEM MOTHER BOARD)


BN-8
BN-J3
BN-J2
BN-J1
BN-20
BLUE
GREEN
RED
BN
SONY
L CAD
BN-1
BN-2
BN-3
BN-4
BN-5
BN-6
BN-7
BA
BB
BC
BD
BE
BF
BG
BN-11
BN-12
BN-13
BN-14
BN-19
BN-16
BN-17
BN-18
BN-21
A/B OUT
RGB/YPbPr
COLOR/B&W
SYNC INT/EXT
A/B IN
GND
+5V
H DELAY
V DELAY
TALY OUT
TALY IN
CONTRAST
PLUGE
DOT
INVERT
H PULSE
V PULSE
V BLK
H SYNC
Y SYNC
ABL
+12V
−12V
AUTO/MANUAL
APERTURE
R DRIVE
G DRIVE
B DRIVE
-92
1-633-259-11

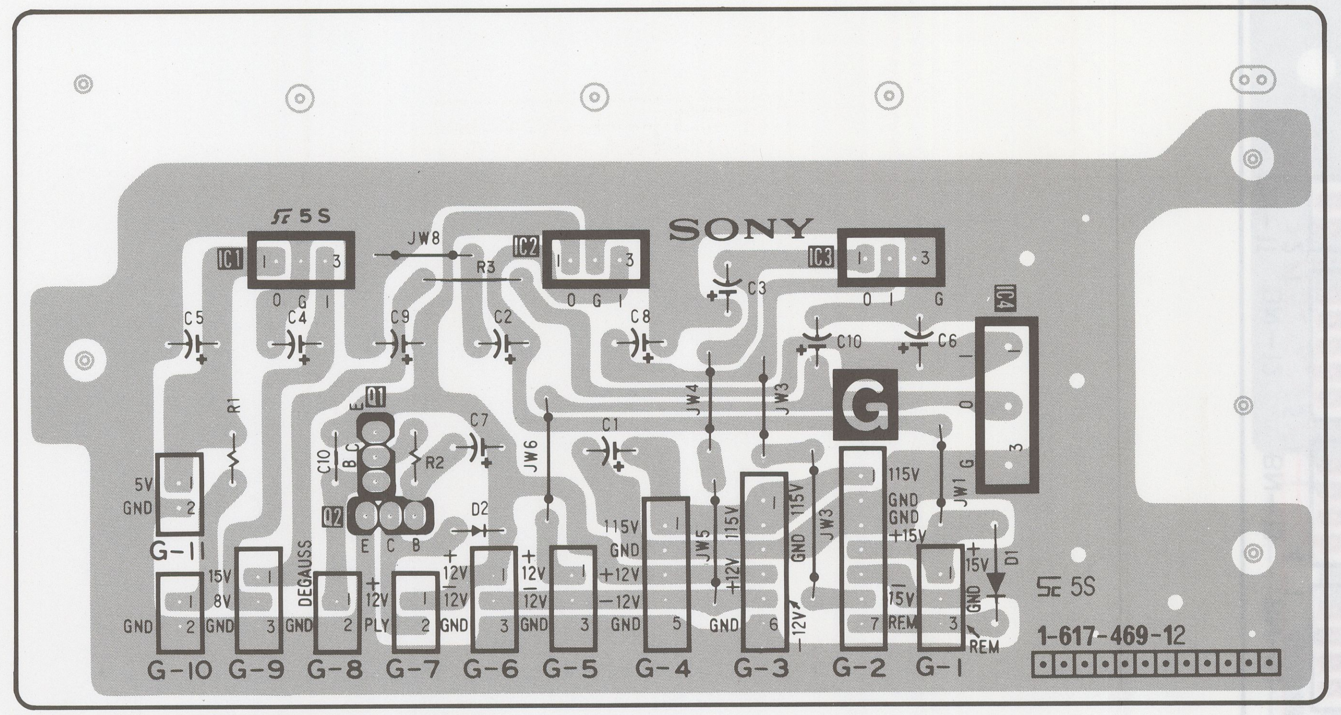
● ▨ : Conductor side pattern
● 🟥 : Component side pattern

CA BOARD (VIDEO OUT)

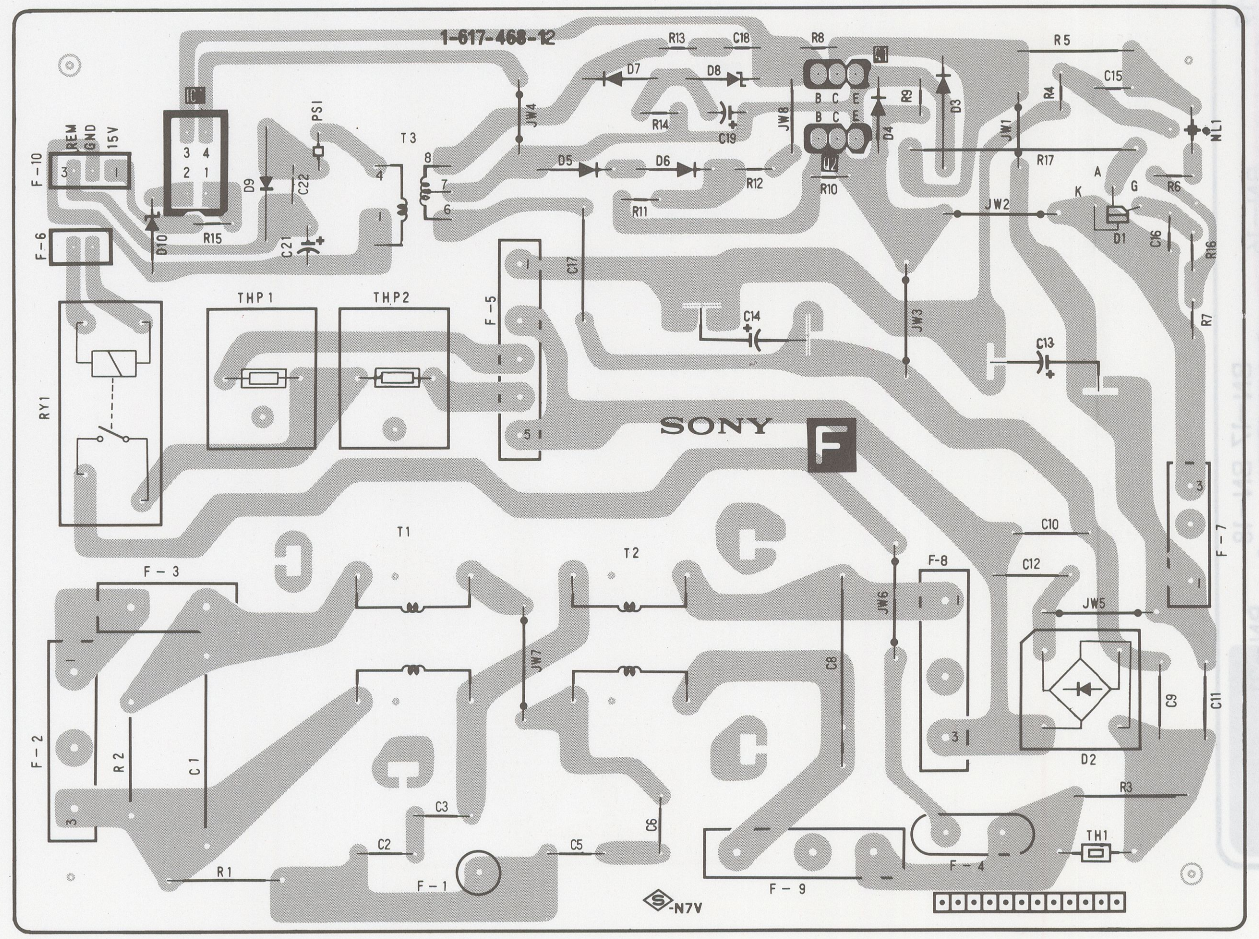
IC	703 701 702 803 801 802 903 901 902
Q	109 108 103 107 102 104 101 110 112 111 106 105 209 208 203 413 410 412 204 207 202 411 210 212 211 201 205 206 401 403 402 309 304 308 303 404 310 307 302 405 406 312 301 305 311 306 407 409 408
D	107 108 103 102 101 114 106 406 115 112 104 109 113 407 203 208 202 404 207 201 214 206 215 401 212 209 204 213 402 308 303 307 302,301 314 306 315 403 312 309 304 313
ADJ TP	TP104 TP413 TP103 TP101 TP102 TP702 TP701 RV702 TP414 CV101 RV101 RV701 TP416 TP404 TP405 TP203 TP412 TP201 TP415, 406 TP202 CV201 RV802, 201, 801 TP802, 801 TP409 TP410, 411, 401, 407 TP303 TP402 TP301 TP408 TP302 TP901 TP902 RV902 TP403 TP418 TP417 RV301 CV301 RV901



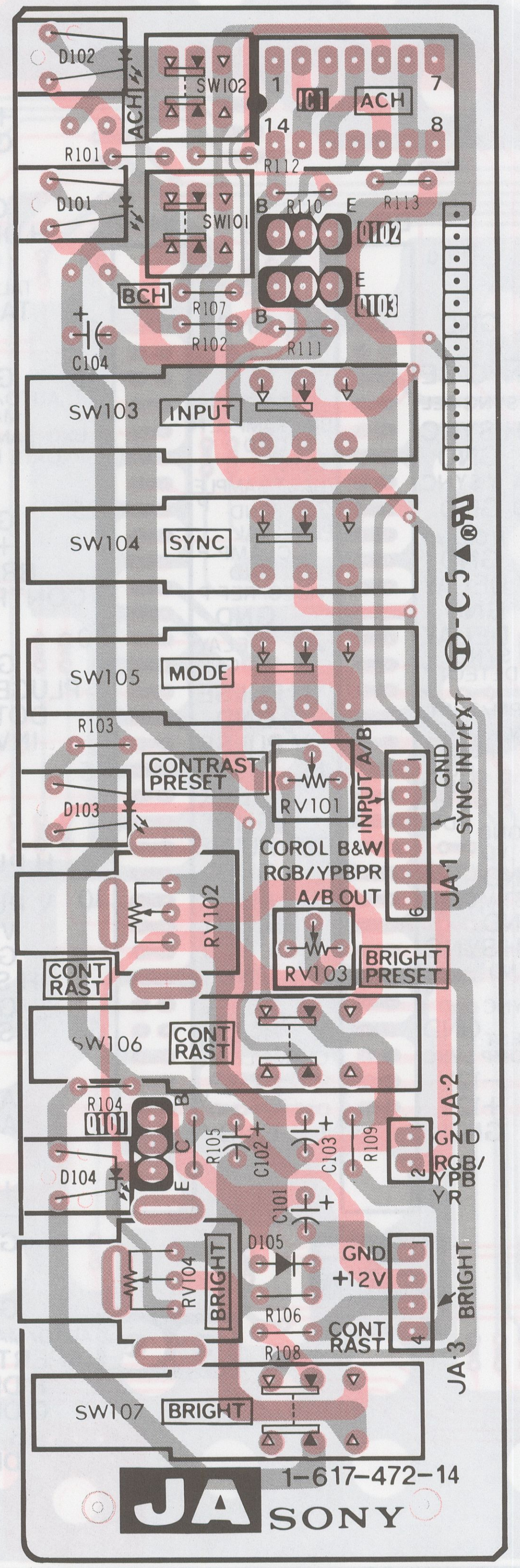
G BOARD (POWER SUPPLY DIVIDING)


SONY
G
1-617-469-12
G-10
G-9
G-8
G-7
G-6
G-5
G-4
G-3
G-2
G-1

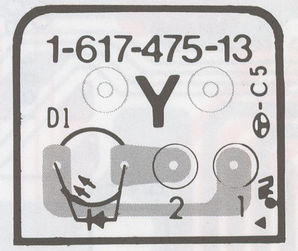
F BOARD (AC RFCTIFIER, FILTER)


1-617-468-12
SONY
F
THP1
THP2

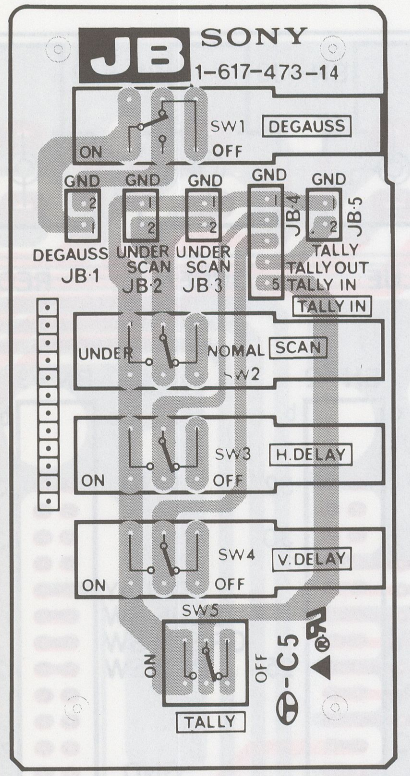
JA BOARD (SIGNAL SWITCH, CONTRAST/BRIGHTNESS VOLUMES)


SW103
INPUT
SW104
SYNC
SW105
MODE
CONTRAST PRESET
RV101
RV102
RV103
BRIGHT PRESET
SW106
SW107
BRIGHT
JA
1-617-472-14
SONY

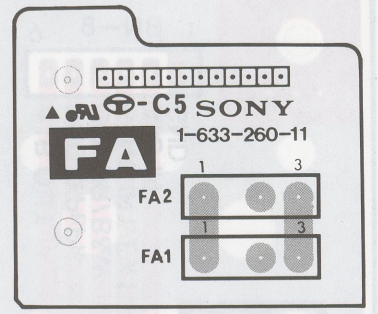
Y BOARD (POWER SUPPY INDICATOR LAMP)


1-617-475-13
Y
D1

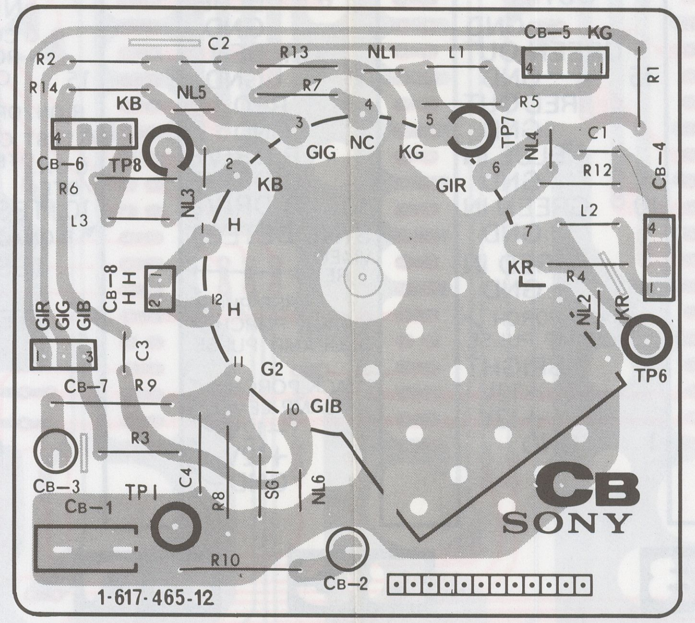
JB BOARD (SCAN MODE, DELAY SWITCH)


JB
SONY
1-617-473-14
DEGAUSS
SCAN
H.DELAY
V.DELAY
TALLY

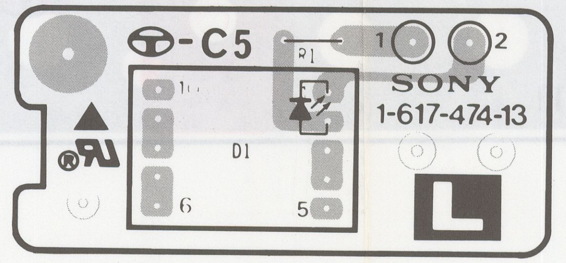
FA BOARD


SONY
FA
1-633-260-11
FA2
FA1

CB BOARD (PICTURE TUBE SOCKET)


CB
SONY
1-617-465-12

L BOARD (TALLY LAMP)


SONY
1-617-474-13
L
D1

▨ : Conductor side pattern

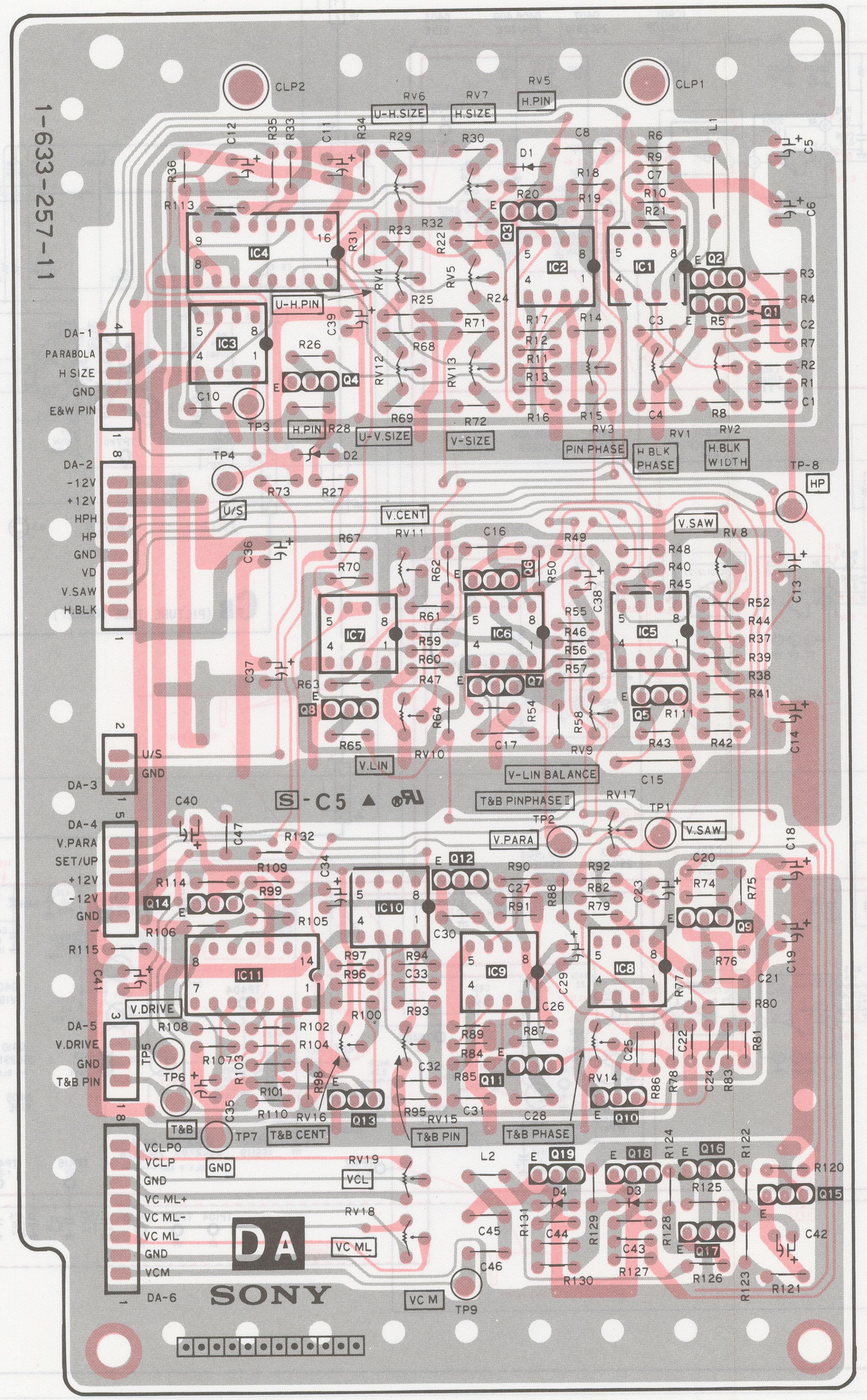
▨ : Component side pattern

CA BOARD (VIDEO OUT) CB BOARD (PICTURE TUBE SOCKET) F BOARD (AC RECTIFICATION AND FILTER) FA BOARD
G BOARD (POWER DISTRIBUTION) JA BOARD (SIGNAL SLECTOR SWITCH AND CONTRAST BRIGHT VOLUME CONTROL)
JB BOARD (SCAN MODE AND DELAY SWITCH) L BOARD (TALLY LAMP) Y BOARD (POWER INDICATOR LAMP)

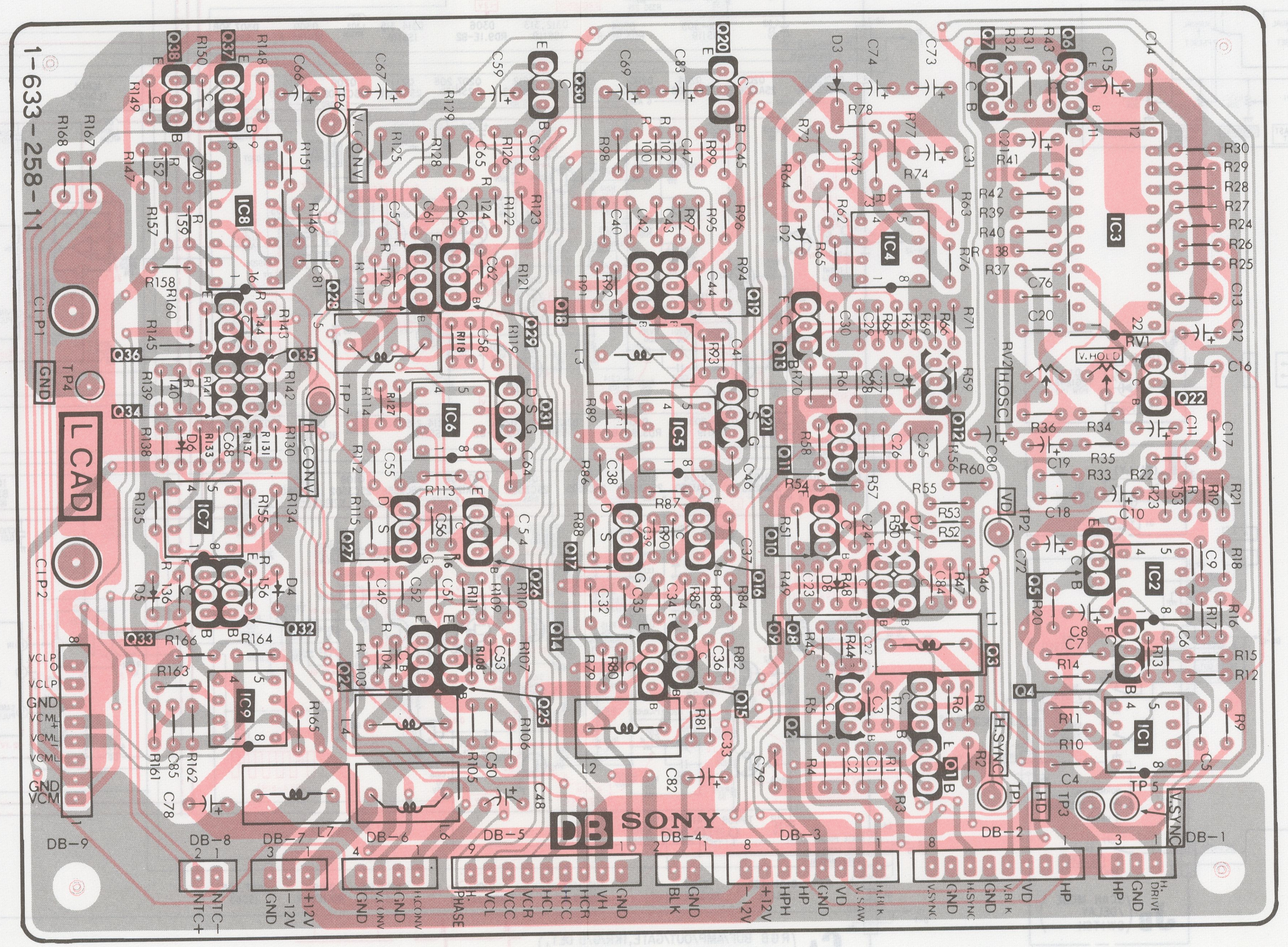
JA (+10V REG INDICATOR)
F (ISOLATE SW OUT, OVP, RECT)
FA
POWER SUPPLY
G (5V/12V/-12V REG, DEGAUSS)
Y (POW IND)
L (TALLY)
JB (SCAN MODE /DELAY SWITCH)
CA (RGB BUF/AMP/OUT/GATE, IKR/G/B DET, RGB GI SW/AMP, BLK P BUF/AMP)
CB (PICTURE TUBE SOCKET)

DA BOARD (DEFLECTION [IMAGE DISTORTION COMPENSATION])
DB BOARD (HORIZONTAL/VERTICAL OSCILLATOR,CONVERGENCE)

IC	Q	D	ADJ, TP
		1	
	3		RV6, RV7
4,2,1	2 1		RV4, RV5
3	4		RV3,RV1, RVI2,RVI3, RV2 TP3
		2	
			TP4 TP8
	6		RV11 RV8
7,6,5			
	7, 5 8		RV10 RV9
			TP2, TP1
	12		
10	14, 9		
11,9,8			
	11		RV16,RV15, RV14
			TP5
	10		TP6
	13		
			TP7
	19,18,16	4, 3	RV19
	15		
	17		RV18
			TP9



IC	7 8 9 6 5 4 3 2 1
Q	38 37 36 34,35 33,32 28 27 29 24, 25 26 31 30 18 19 17 14 16 15 20 21 13 10 11 9 8 2 12 3 1 7 6 22 5 4
D	5 6 4 2 3 8 1 7
ADJ TP	TP4 TP7 TP6 TP2 TP1 RV2 RV1 TP3, TP5



DA BOARD

D1	1SS119TD	PROT
2	RD4.7ES-T1B2	BIAS
3	1SS119TD	LIMIT 1
4	1SS119TD	LIMIT 2
IC1	μPC311C	BLK
2	RC4558DQ	H PIN
3	RC4558DQ	H SIZE
4	MC14053BCP	SW
5	RC4558DQ	V SAW
6	RC4558DQ	V LIN
7	RC4558DQ	V SIZE & DRIVE
8	μPC311C	T & B PIN COMP
9	TL082CP	T & B PIN (H)
10	RC4558DQ	T & B PIN (V)
11	MC1496P	BALANCED MOD
Q1	2SC2785TP-H	SW 1
2	2SC2785TP-H	SW 2
3	2SC2878-A	H PIN
4	2SC2878-A	U-H PIN
5	2SC2878-A	V SAW
6	2SC2878-A	V PARA
7	2SC2878-A	V SIN
8	2SC2878-A	U-V SAW
9	2SC2785TP-H	SW 3
10	2SC2785TP-H	SW 4
11	2SC2878-A	T & B 1
12	2SC2878-A	T & B 2
13	2SC2878-A	MUTE
14	2SC2785TP-H	BUFF 1
15	2SC2785TP-H	BUFF 2
16	2SC2785TP-H	BUFF 3
17	2SD789-4	MODU
18	2SC2785TP-H	SW 5
19	2SC2785TP-H	SW 6

▨ Conductor side pattern
🟥 Component side pattern

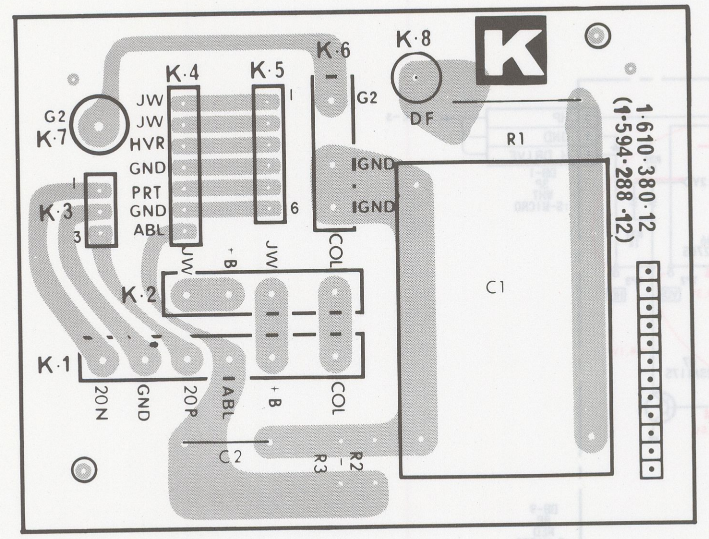
DB BOARD

D1	1SS119TD	SW 1
2	RD4.7ES-T1B2	BIAS 1
3	RD4.7ES-T1B2	BIAS 2
4	1SS119TD	PROT 1
5	1SS119TD	PROT 2
6	1SS119TD	SW 2
7	1SS119TD	LIMIT 1
8	1SS119TD	PROT 3
IC1	μPC311C	AFC 1
2	μPC311C	AFC 2
3	μPC1377C	HV.OSC
4	LM2903DQ	PULSE
5	RC4558DQ	CONV 1
6	RC4558DQ	CONV 2
7	μPC814C	CONV 3
8	MC14053BCP	SW
9	μPC814C	CONV AMP
Q1	2SC2785TP-H	BUFF 1
2	2SC2785TP-H	BUFF 2
3	2SC2878-A	SW 1
4	2SC2785TP-H	SW 2
5	2SC2785TP-H	AFC SW
6	2SC2785TP-H	VD
7	2SA1175TP-E	HD
8	2SC2785TP-H	H BLK
9	2SC2785TP-H	V BLK
10	2SC2785TP-H	SW 3
11	2SC2785TP-H	SW 4
12	2SC2785TP-H	SW 5
13	2SC2785TP-H	SW 6
14	2SC2878-A	SW 7
15	2SC2785TP-H	AMP 1
16	2SC2785TP-H	BUFF 3
17	2SK523TP-L2	CLP 1
18	2SC2878-A	SW 8
19	2SC2785TP-H	AMP 2
20	2SC2785TP-H	BUFF 4
21	2SK523TP-L2	CLP 2
22	2SC2785TP-H	REG
24	2SC2785TP-H	SW 9
25	2SC2785TP-H	AMP 3
26	2SC2785TP-H	BUFF 5
27	2SK523TP-L2	CLP 3
28	2SC2785TP-H	SW 10
29	2SC2785TP-H	AMP 4
30	2SC2785TP-H	BUFF 6
31	2SK523TP-L2	CLP 4
32	2SC2785TP-H	NTC AMP 1
33	2SA1175TP-E	NTC AMP 2
34	2SC2785TP-H	Y BOW
35	2SC2785TP-H	H AMP
36	2SC2785TP-H	BUFF 7
37	2SC2785TP-H	BUFF 8
38	2SA1175TP-E	BUFF 9

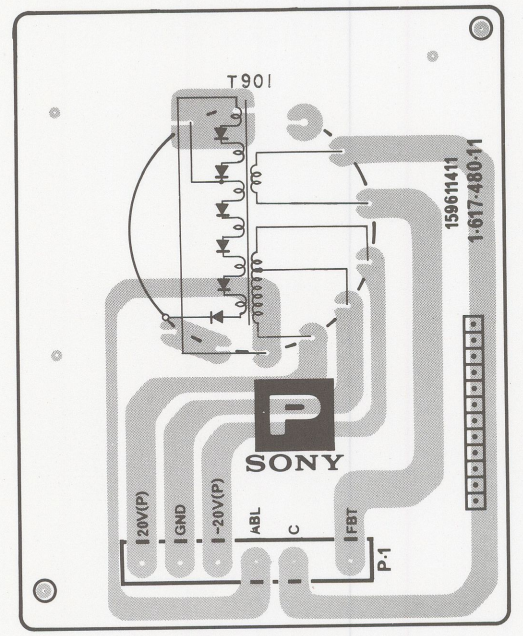
DA BOARD (DEFLECTION [IMAGE DISTORTION COMPENSATION])
DB BOARD (HORIZONTAL/VERTICAL OSCILLATOR, CONVERGENCE)

DA-2 8P WHT :S-MICRO
H. BLK 1
V SAW 2
VD 3
GND 4
HP 5
HPH 6
+12V 7
-12V 8
DA-6 8P RED :S-MICRO
VCM 1
GND 2
VCML 3
VCML- 4
VCML+ 5
GND 6
VCLP 7
VCLPO 8
VC ML
VC L
DA-1 4P YEL :S-MICRO
4 PARABOLA
3 H SIZE
2 GND
1 E&W PIN
TO E-2
DA-3 2P RED :S-MICRO
2 U/S
1 GND
TO JB-2
DA-4 5P WHT :S-MICRO
1 GND
2 -12V
3 +12V
4 SET/UP
5 V PARA
TO I-7
DA-5 3P BLK :S-MICRO
3 V DRIVE
2 GND
1 T&B PIN
TO E-10
0.6Vp-p(V)
DA
(H BLK, H/V PARA, V SAW, V AMP H SIZE, PIN AMP, T&B PHASE, T&B AMP)
DB-2 8P BLK :S-MICRO
TO BN-16
HP 1
2
VD 3
V BLK 4
GND 5
H SYNC 6
GND 7
V SYNC 8
-12V 8
+12V 7
HPH 6
HP 5
GND 4
VD 3
V SAW 2
H BLK 1
DB-3 8P WHT :S-MICRO
CA-7
BLK 2
GND 1
DB-4 2P WHT :S-MICRO
DB-5 9P YEL :S-MICRO
TO I-8
H PHASE 9
VCL 8
VCC 7
VCR 6
HCL 5
HCC 4
HCR 3
VH 2
GND 1
TO I BOARD I-8
TO G-6
+12V 1
-12V 2
GND 3
DB-7 3P BLK :S-MICRO
3 HP
2 GND
1 H DRIVE
TO E-3
DB-1 3P WHT :S-MICRO
DB-9 8P RED :S-MICRO
8 VCLPO
7 VCLP
6 GND
5 VCML+
4 VCML-
3 VCML
2 GND
1 VCM
4 GND
3 V. CONV
2 GND
1 H. CONV
TO E-11
DB-6 4P RED :S-MICRO
DB
(H AFC, H OSC. H DRIVE, V OSC. VD H SAW H PARABOLA. H/V BLK V C M AMP)

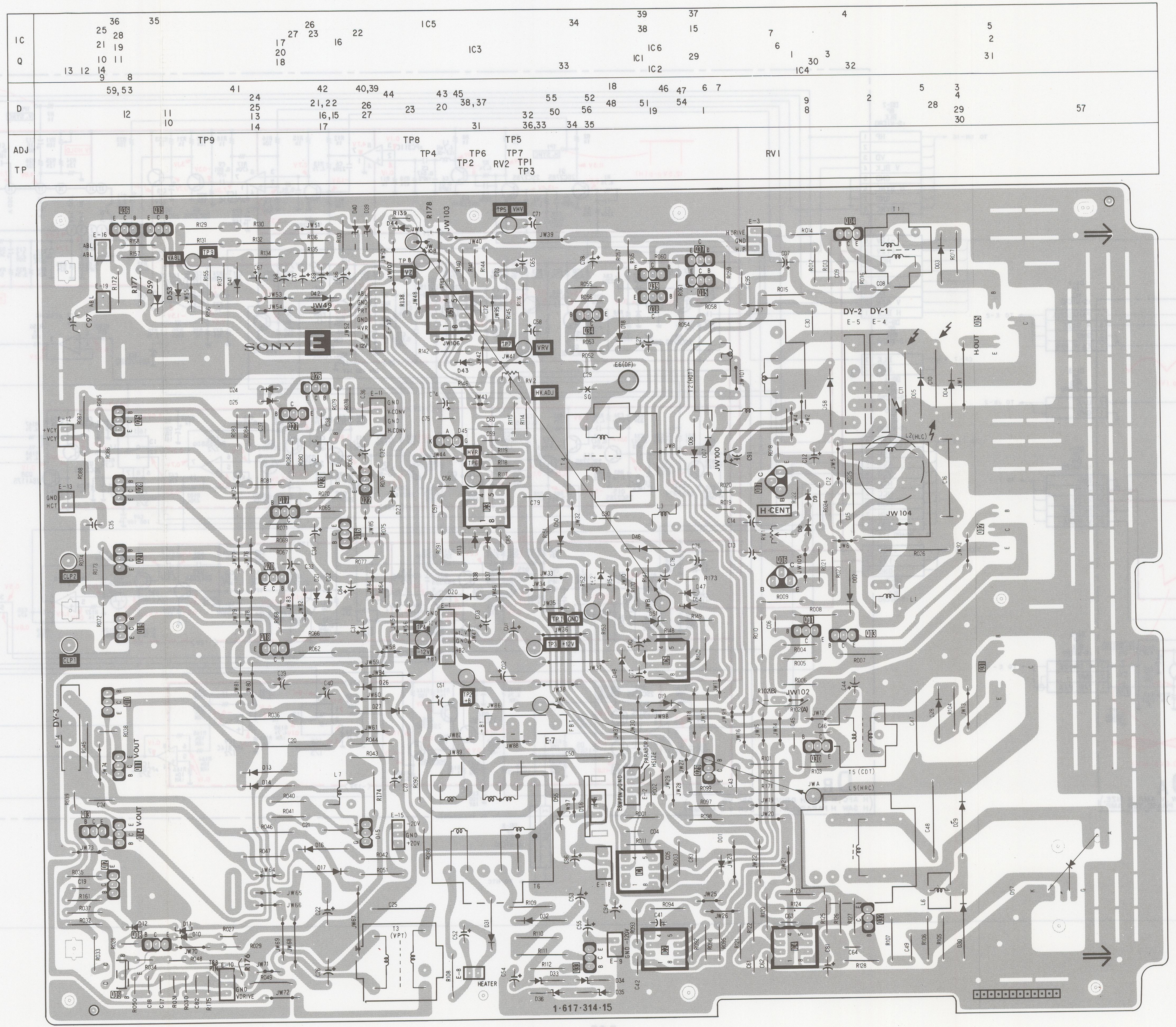
K board (DYNAMIC FOCUS, CONNECTOR RELAY)


K
K-8
K-6
K-4
K-5
G2
K-7
JW
HVR
GND
PRT
GND
ABL
K-3
K-2
K-1
DF
R1
C1
C2
G2
GND
GND
COL
20N
GND
20P
1-610-380-12
(1-594-288-12)

P board (EHT TRANSFORMER)


T901
1-617-480-11
P
SONY
+25V(P)
GND
+20V(P)
ABL
GND
FBT
P1

E board (H/V DEFLECTION OUTPUT, DYNAMIC FOCUS, EHT REG)


IC
Q
D
ADJ
TP
IC5
IC3
IC1
IC6
IC2
IC4
TP9
TP8
TP4
TP6
TP2
RV2
TP5
TP7
TP1
TP3
RV1
SONY
E
H CENT
1-617-314-15

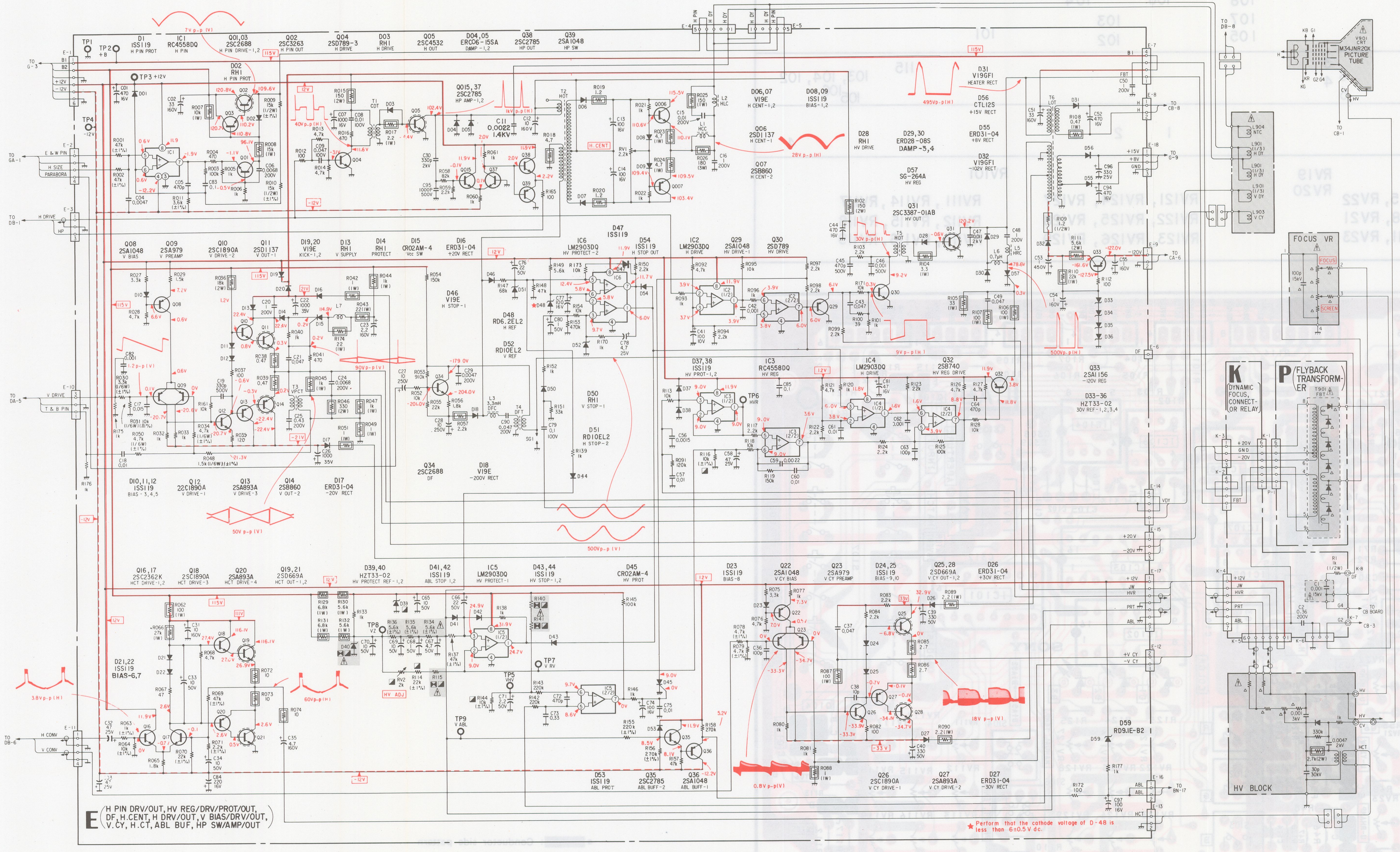
E board

IC	1	RC4558DQ	H PIN
	2	LM2903DQ	H DRIVE
	3	RC4558DQ	HV REG
	4	LM2903DQ	H DRIVE
	5	LM2903DQ	H PROTECT-1
	6	LM2903DQ	H PROTECT-1
Q	1	2SC2688	H PIN DRIVE-1
	2	2SC3263	H PIN OUT
	3	2SC2688	H PIN DRIVE-2
	4	2SD789	H DRIVE
	5	2SC4532	H OUT
	6	2SD1137	H CENT-1
	7	2SB860	H CENT-2
	8	2SA1048	V BIAS
	9	2SA979	V PREAMP
	10	2SC1890A	V DRIVE-2
	11	2SD1137	V OUT-1
	12	2SC1890A	V DRIVE-1
	13	2SA893A	V DRIVE-3
	14	2SB860	V OUT-2
	15	2SC2785	HP AMP-1
	16	2SC2362K	HCT DRIVE-1
	17	2SC2362K	HCT DRIVE-2
	18	2SC1890A	HCT DRIVE-3
	19	2SD669A	HCT OUT-1
	20	2SA893A	HCT DRIVE-4
	21	2SD669A	HCT OUT-2
	22	2SA1048	V CY BIAS
	23	2SA979	V CY PREAMP
	25	2SD669	V CY OUT-1
	26	2SC1890A	V CY DRIVE-1
	27	2SA893A	V CY DRIVE-2
	28	2SD669A	V CY OUT-2
	29	2SA1048	H DRIVE-1
	30	2SD789	H DRIVE-2
	31	2SC3387	HV OUT
	32	2SB740	HV REG DRIVE
	33	2SA1156	−120V REG
	34	2SC2688	DF
	35	2SC2785	ABL BUFF-2
	36	2SA1048	ABL BUFF-1
	37	2SC2785	HP AMP-2
	38	2SC2785	HP OUT
	39	2SA1048	HP SW

D	1	1SS119	H PIN PROT
	2	RH-1	H PIN PROT
	3	RH-1	H DRIVE
	4	ERC06-15SA	DAMP-1
	5	ERC06-15SA	DAMP-2
	6	V19EF1	H CENT-1
	7	V19EF1	H CENT-2
	8	1SS119	BIAS-1
	9	1SS119	BIAS-2
	10	1SS119	BIAS-3
	11	1SS119	BIAS-4
	12	1SS119	BIAS-5
	13	RH-1	V SUPPLY
	14	RH-1	PROTECT
	15	CR02AM-4	Vcc SW
	16	ERD31-04	+20V RECT
	17	ERD31-04	−20V RECT
	18	V19EF1	−200V RECT
	19	V19EF1	KICK-1
	20	V19EF1	KICK-2
	21	1SS119	BIAS-6
	22	1SS119	BIAS-7
	23	1SS119	BIAS-8
	24	1SS119	BIAS-9
	25	1SS119	BIAS-10
	26	ERD31-04	30V RECT
	27	ERD31-04	−30V RECT
	28	RH-1	HV DRIVE
	29	ERD28-08S	DAMP-3
	30	ERD28-08S	DAMP-4
	31	V19GF1	HEATER RECT
	32	V19GF1	−102V RECT
	33	HZT33-02	30V REF-1
	34	HZT33-02	30V REF-2
	35	HZT33-02	30V REF-3
	36	HZT33-02	30V REF-4
	37	1SS119	HV PROT-1
	38	1SS119	HV PROT-2
	39	HZT33-02	HV PROT REF-1
	40	HZT33-02	HV PROT REF-2
	41	1SS119	ABL STOP-1
	42	1SS119	ABL STOP-2
	43	1SS119	HV STOP-1
	44	1SS119	HV STOP-2
	45	CR02AM-4	HV PROT

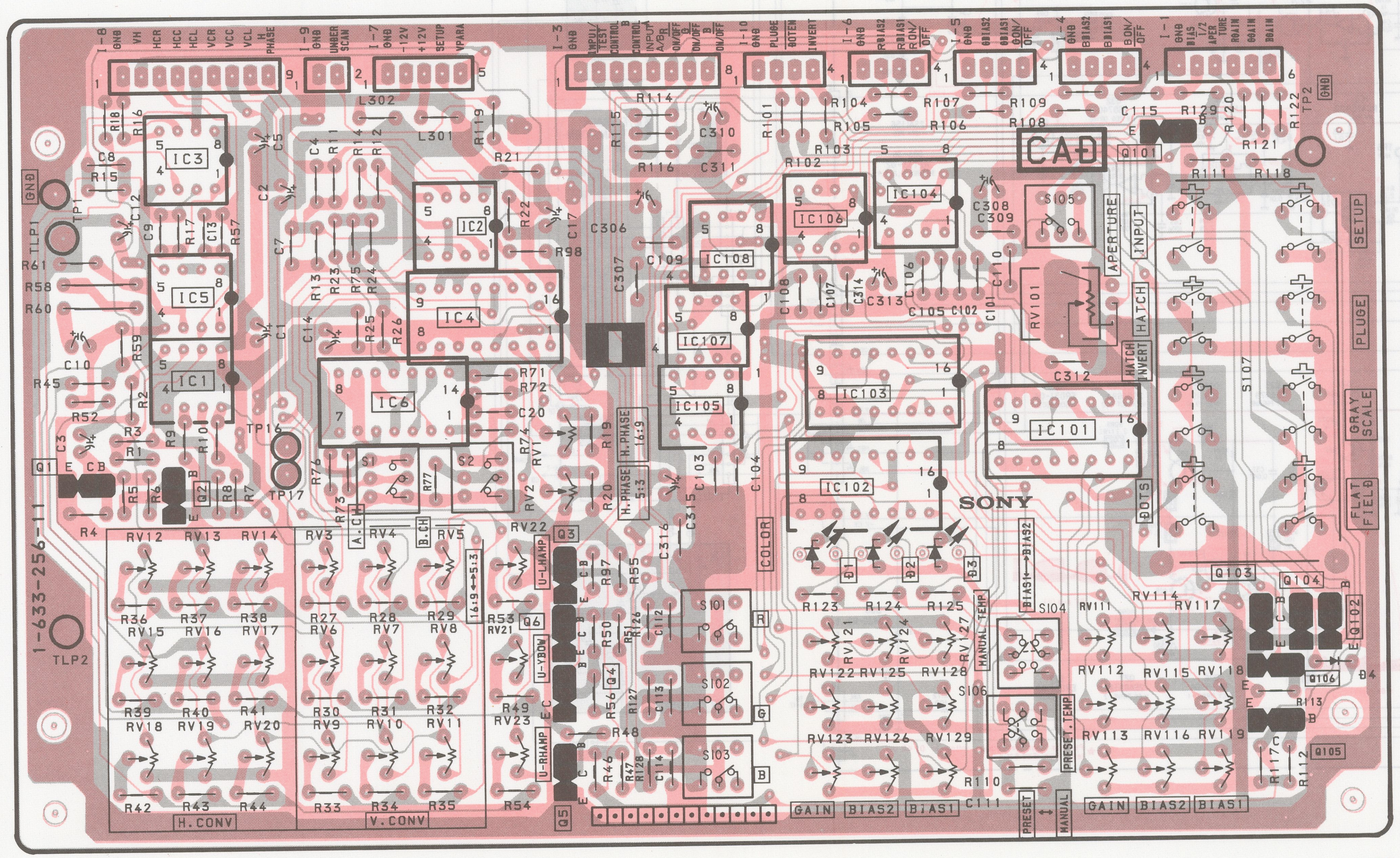
46	V19EF1	H STOP-1
47	1SS119	
48	RD6.2EL2	H REF
50	RH-1	V STOP-1
51	RD10EL2	H STOP-2
52	RD10EL2	V REF
53	1SS119	ABL PROT
54	1SS119	H STOP OUT
55	ERD31-04	+8V RECT
56	CTL-12S	+15V RECT
57	SG-264A	HV REG
59	RD9.1EB2	

E board (H/V DEFLECTION OUTPUT, DYNAMIC FOCUS, EHT REG) K board (DYNAMIC FOCUS, CONNECTOR RELAY) P board (EHT TRANSFORMER)


E
H PIN DRV/OUT, HV REG/DRV/PROT/OUT, DF, H.CENT, H DRV/OUT, V BIAS/DRV/OUT, V.CY, H.CT, ABL BUF, HP SW/AMP/OUT
K
DYNAMIC FOCUS, CONNECTOR RELAY
P
FLYBACK TRANSFORMER
FOCUS VR
HV BLOCK
M34JNR20X PICTURE TUBE
IC1 RC4558DD
IC2 LM2903DQ
IC3 RC4558DQ
IC4 LM2903DQ
IC5 LM2903DQ
IC6 LM2903DQ
★ Perform that the cathode voltage of D-48 is less than 6±0.5 V dc.

I board (SUB CONVERGENCE, DOUBLE HATCH GEN, WHITE BALANCE, SIGNAL SELECT, APERTURE)

IC	3 5 1	6 4 2		108 107 105	106 103 104 102	101	
Q	1 2		6 3 4 5			115	103, 104, 102 105 106
D					1 2 3		4
ADJ TP	TP1 RV12, RV13, RV14, TP16, TP17 RV15, RV16, RV17 RV18, RV19, RV20	RV3, RV4, RV5, RV22 RV6, RV7, RV8, RV21 RV9, RV10, RV11, RV23	RV19 RV20		RV121, RV124, RV127 RV122, RV125, RV128 RV123, RV126, RV129	RV101 RV111, RV114, RV117 RV112, RV115, RV118 RV113, RV116, RV119	



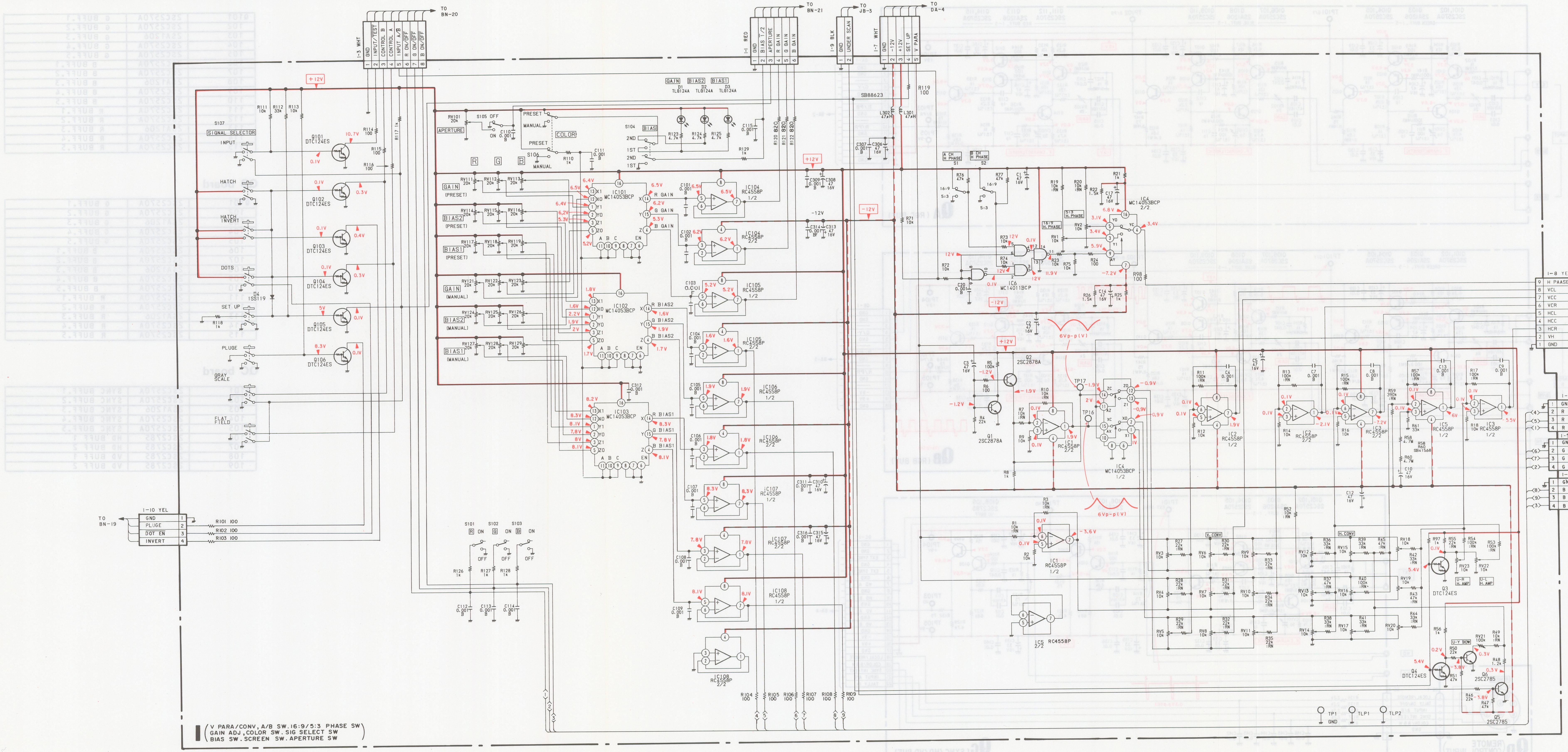
I-8
GND
VH
HCR
HCC
HCL
VCR
VCC
VCL
H PHASE
I-9
GND
UNDER SCAN
I-7
GND
-12V
+12V
SETUP
VPARA
I-3
GND
INPUT/TEST
CONTROL B
CONTROL
INPUT A/B
ON/OFF
I-10
GND
PLUGE
BOTEN
INVERT
I-6
GND
RBIAS2
RBIAS1
RON/OFF
I-5
GND
GBIAS2
GBIAS1
GON/OFF
I-4
GND
BBIAS2
BBIAS1
BON/OFF
I-1
GND
BIAS
1/2 APER TURE
RGAIN
GGAIN
BGAIN
IC3
IC2
IC5
IC4
IC1
IC6
IC108
IC106
IC104
IC107
IC105
IC103
IC101
IC102
CAD
SONY
S105
S107
S1
S2
S101
S102
S103
S104
S106
Q1
Q2
Q3
Q4
Q5
Q6
Q101
Q102
Q103
Q104
Q105
Q106
D1
D2
D3
D4
TP1
TP16
TP17
TLP1
TLP2
RV101
APERTURE
INPUT
HATCH
HATCH INVERT
SETUP
PLUGE
GRAY SCALE
FLAT FIELD
DOTS
COLOR
H.PHASE 16:9
H.PHASE 5:3
A.CH
B.CH
U-HAMP
U-YBOW
U-RHAMP
MANUAL TEMP
BIAS1↔BIAS2
PRESET TEMP
PRESET
MANUAL
H.CONV
V.CONV
GAIN
BIAS2
BIAS1
1-633-256-11

- ▨ : Conductor side pattern
- ▨ : Component side pattern

I BOARD

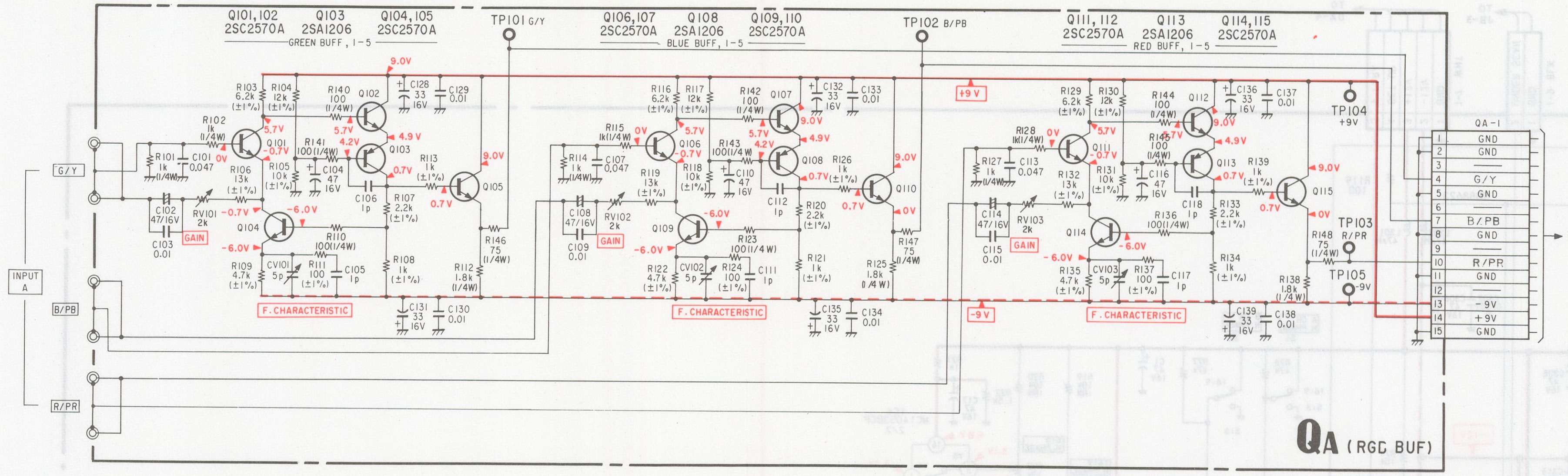
D1	TLG124A	GAIN REF
2	TLG124A	BIAS 2 REF
3	TLG124A	BIAS 1 REF
4	1SS119TD	SET UP PROT
IC1	RC4558P	V PARA
2	RC4558P	V CONV 1
3	RC4558P	V CONV 2
4	MC14053BCP	CONV SW
5	RC4558P	V CONV 3
6	MC14011BCP	H. PHASE
101	MC14053BCP	COLOR SW 1
102	MC14053BCP	COLOR SW 2
103	MC14053BCP	COLOR SW 3
104	RC4558P	COLOR BUFF 1
105	RC4558P	COLOR BUFF 2
106	RC4558P	COLOR BUFF 3
107	RC4558P	COLOR BUFF 4
108	RC4558P	COLOR BUFF 5
Q1	2SC2878-A	BUFF 1
2	2SC2878-A	CLP
3	DTC124ES	U-H AMP
4	DTC124ES	BUFF 2
5	2SC2785TP-H	SET UP
6	2SC2785TP-H	U-Y BOW
101	DTC124ES	INV 1
102	DTC124ES	INV 2
103	DTC124ES	INV 3
104	DTC124ES	INV 4
105	DTC124ES	INV 5
106	DTC124ES	INV 6

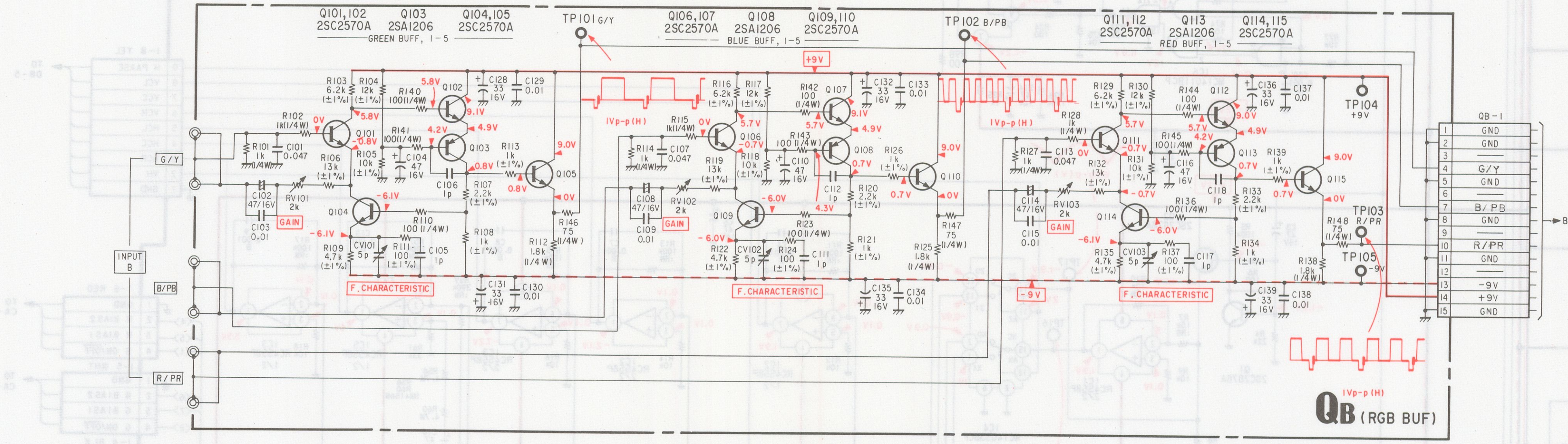
I board (SUB CONVERGENCE, DOUBLE HATCH GEN, WHITE BALANCE, SIGNAL SELECT, APERTURE)

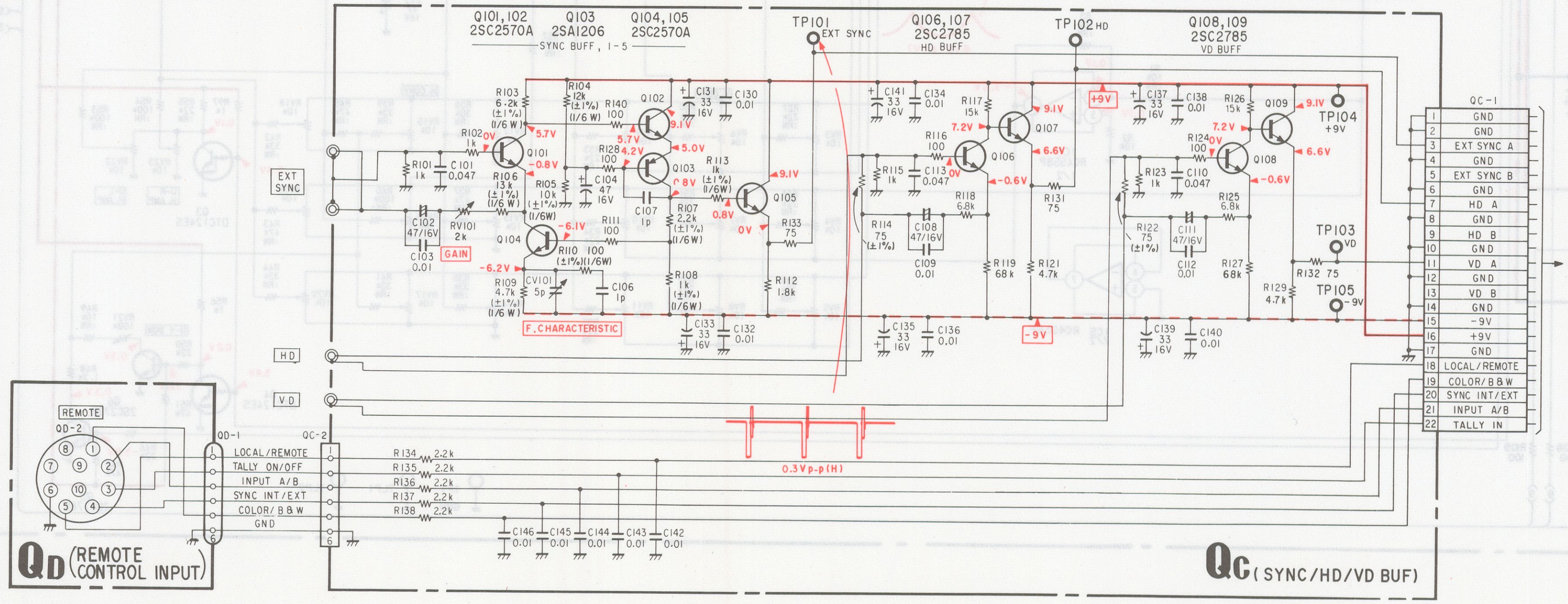

I-3 WHT
1 GND
2 INPUT/TEST
3 CONTROL B
4 CONTROL A
5 INPUT A/B
6 R ON/OFF
7 G ON/OFF
8 B ON/OFF
TO BN-20
I-1 RED
1 GND
2 BIAS 1/2
3 APERTURE
4 R GAIN
5 G GAIN
6 B GAIN
TO BN-21
I-9 BLK
1 GND
2 UNDER SCAN
TO JB-3
I-7 WHT
1 GND
2 -12V
3 +12V
4 SET UP
5 V PARA
TO DA-4
R119 100
SB88623
GAIN
BIAS2
BIAS1
D1 TLG124A
D2 TLG124A
D3 TLG124A
S107
SIGNAL SELECTOR
INPUT
HATCH
HATCH INVERT
DOTS
SET UP
PLUGE
GRAY SCALE
FLAT FIELD
Q101 DTC124ES
Q102 DTC124ES
Q103 DTC124ES
Q104 DTC124ES
Q105 DTC124ES
Q106 DTC124ES
D4 1SS119
+12V
APERTURE
S105 OFF ON
S106 MANUAL
S104 BIAS
PRESET
MANUAL
COLOR
R G B
GAIN (PRESET)
BIAS2 (PRESET)
BIAS1 (PRESET)
GAIN (MANUAL)
BIAS2 (MANUAL)
BIAS1 (MANUAL)
IC101 MC14053BCP
IC102 MC14053BCP
IC103 MC14053BCP
R GAIN
G GAIN
B GAIN
R BIAS2
G BIAS2
B BIAS2
R BIAS1
G BIAS1
B BIAS1
IC104 RC4558P 1/2
IC104 RC4558P 2/2
IC105 RC4558P 1/2
IC105 RC4558P 2/2
IC106 RC4558P 1/2
IC106 RC4558P 2/2
IC107 RC4558P 1/2
IC107 RC4558P 2/2
IC108 RC4558P 1/2
IC108 RC4558P 2/2
-12V
I-10 YEL
GND
PLUGE
DOT EN
INVERT
TO BN-19
R101 100
R102 100
R103 100
S101 R ON OFF
S102 G ON OFF
S103 B ON OFF
A CH H PHASE S1
B CH H PHASE S2
16:9
5:3
IC6 MC14011BCP
IC4 MC14053BCP 1/2
IC4 MC14053BCP 2/2
Q1 2SC2878A
Q2 2SC2878A
TP16
TP17
6Vp-p(V)
IC1 RC4558P 1/2
IC1 RC4558P 2/2
IC2 RC4558P 1/2
IC2 RC4558P 2/2
IC3 RC4558P 1/2
IC3 RC4558P 2/2
IC5 RC4558P 2/2
V CONV
H CONV
U-R H AMP
U-L H AMP
U-Y BOW
Q3 DTC124ES
Q4 DTC124ES
Q5 2SC2785
Q6 2SC2785
TP1 GND
TLP1
TLP2
I-8 YEL
9 H PAASE
8 VCL
7 VCC
6 VCR
5 HCL
4 HCC
3 HCR
2 VH
1 GND
TO DB-5
I-6 RED
1 GND
2 R BIAS2
3 R BIAS1
4 R ON/OFF
TO CA-1
I-5 WHT
1 GND
2 G BIAS2
3 G BIAS1
4 G ON/OFF
TO CA-2
I-4 BLK
1 GND
2 B BIAS2
3 B BIAS1
4 B ON/OFF
TO CA-3

I (V PARA/CONV, A/B SW.16:9/5:3 PHASE SW
GAIN ADJ, COLOR SW. SIG SELECT SW
BIAS SW. SCREEN SW. APERTURE SW)

QA board (RGB INPUT) QB board (RGB INPUT) QC board (EXT SYNC/HD/VD INPUT) QD board (REMOTE CONTROL INPUT)


Q101, 102 2SC2570A
Q103 2SA1206
Q104, 105 2SC2570A
GREEN BUFF, 1-5
TP101 G/Y
Q106, 107 2SC2570A
Q108 2SA1206
Q109, 110 2SC2570A
BLUE BUFF, 1-5
TP102 B/PB
Q111, 112 2SC2570A
Q113 2SA1206
Q114, 115 2SC2570A
RED BUFF, 1-5
TP104 +9V
TP103 R/PR
TP105 -9V
+9V
-9V
GAIN
F. CHARACTERISTIC
INPUT A
G/Y
B/PB
R/PR
QA-1
GND
G/Y
B/PB
R/PR
-9V
+9V
BA-2
QA (RGB BUF)


Q101, 102 2SC2570A
Q103 2SA1206
Q104, 105 2SC2570A
GREEN BUFF, 1-5
TP101 G/Y
Q106, 107 2SC2570A
Q108 2SA1206
Q109, 110 2SC2570A
BLUE BUFF, 1-5
TP102 B/PB
Q111, 112 2SC2570A
Q113 2SA1206
Q114, 115 2SC2570A
RED BUFF, 1-5
TP104 +9V
TP103 R/PR
TP105 -9V
1Vp-p (H)
+9V
-9V
GAIN
F. CHARACTERISTIC
INPUT B
G/Y
B/PB
R/PR
QB-1
GND
G/Y
B/PB
R/PR
-9V
+9V
BA-3
QB (RGB BUF)


Q101, 102 2SC2570A
Q103 2SA1206
Q104, 105 2SC2570A
SYNC BUFF, 1-5
TP101 EXT SYNC
Q106, 107 2SC2785
HD BUFF
TP102 HD
Q108, 109 2SC2785
VD BUFF
TP104 +9V
TP103 VD
TP105 -9V
+9V
-9V
GAIN
F. CHARACTERISTIC
EXT SYNC
HD
VD
REMOTE
QD-2
QD-1
QC-2
LOCAL/REMOTE
TALLY ON/OFF
INPUT A/B
SYNC INT/EXT
COLOR/B&W
GND
0.3Vp-p (H)
QC-1
GND
EXT SYNC A
EXT SYNC B
HD A
HD B
VD A
VD B
-9V
+9V
LOCAL/REMOTE
COLOR/B&W
SYNC INT/EXT
INPUT A/B
TALLY IN
BA-4
QD (REMOTE CONTROL INPUT)
QC (SYNC/HD/VD BUF)

QA board

Q101	2SC2570A	G BUFF.1
102	2SC2570A	G BUFF.2
103	2SA1206	G BUFF.3
104	2SC2570A	G BUFF.4
105	2SC2570A	G BUFF.5
106	2SC2570A	B BUFF.1
107	2SC2570A	B BUFF.2
108	2SA1206	B BUFF.3
109	2SC2570A	B BUFF.4
110	2SC2570A	B BUFF.5
111	2SC2570A	R BUFF.1
112	2SC2570A	R BUFF.2
113	2SA1206	R BUFF.3
114	2SC2570A	R BUFF.4
115	2SC2570A	R BUFF.5

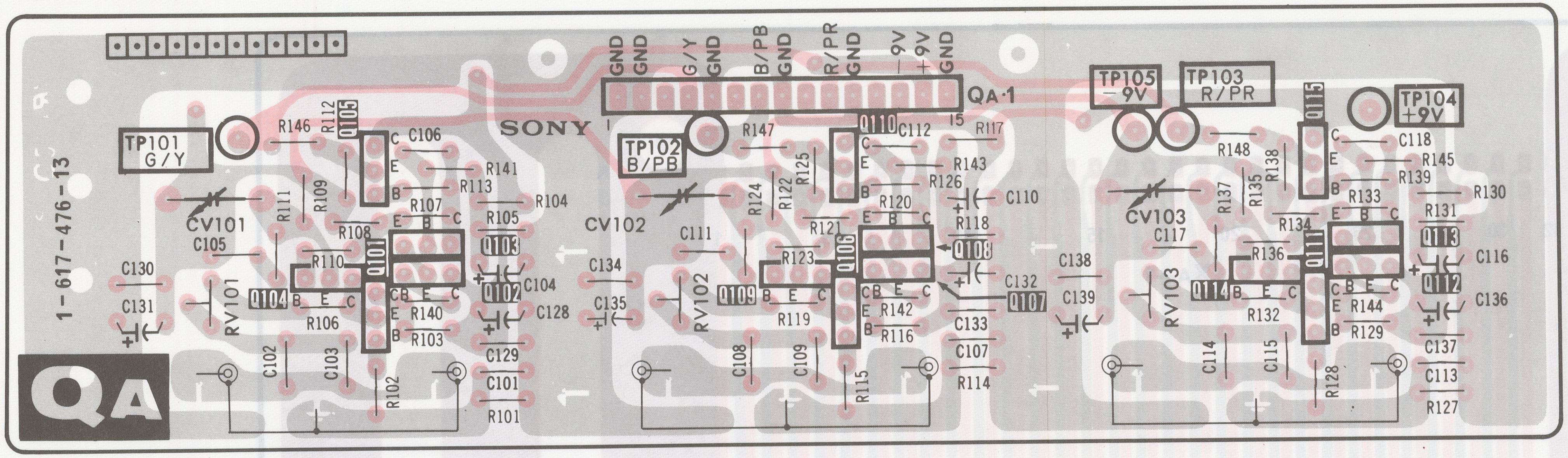
QB board

Q101	2SC2570A	G BUFF.1
102	2SC2570A	G BUFF.2
103	2SA1206	G BUFF.3
104	2SC2570A	G BUFF.4
105	2SC2570A	G BUFF.5
106	2SC2570A	B BUFF.1
107	2SC2570A	B BUFF.2
108	2SA1206	B BUFF.3
109	2SC2570A	B BUFF.4
110	2SC2570A	B BUFF.5
111	2SC2570A	R BUFF.1
112	2SC2570A	R BUFF.2
113	2SA1206	R BUFF.3
114	2SC2570A	R BUFF.4
115	2SC2570A	R BUFF.5

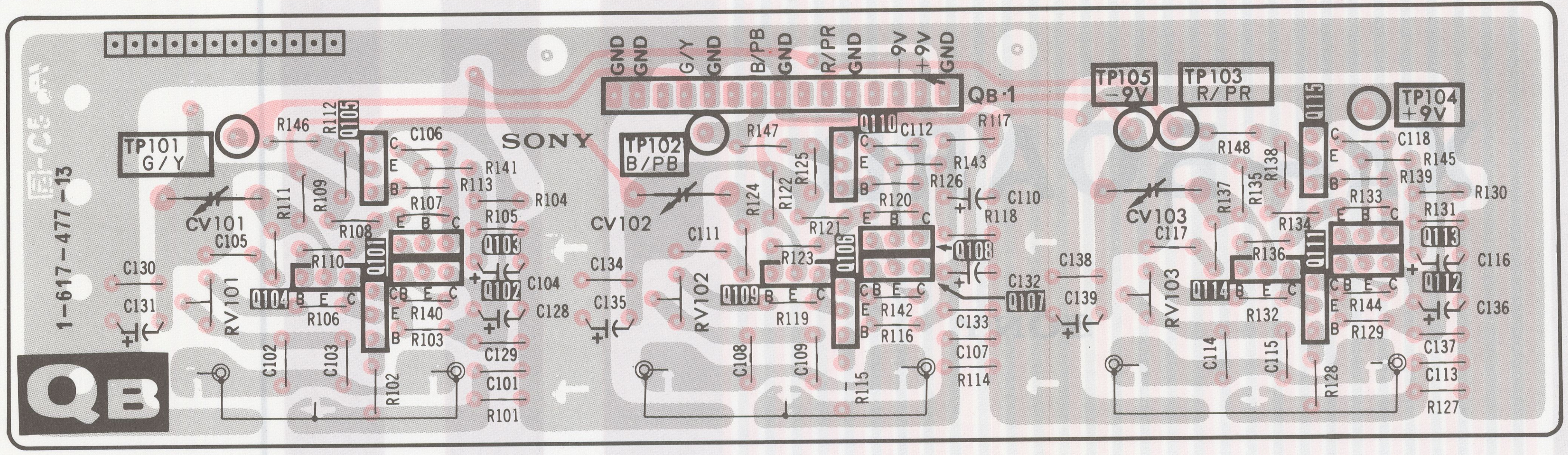
QC board

Q101	2SC2570A	SYNC BUFF.1
102	2SC2570A	SYNC BUFF.2
103	2SA1206	SYNC BUFF.3
104	2SC2570A	SYNC BUFF.4
105	2SC2570A	SYNC BUFF.5
106	2SC2785	HD BUFF 1
107	2SC2785	HD BUFF 2
108	2SC2785	VD BUFF 1
109	2SC2785	VD BUFF 2

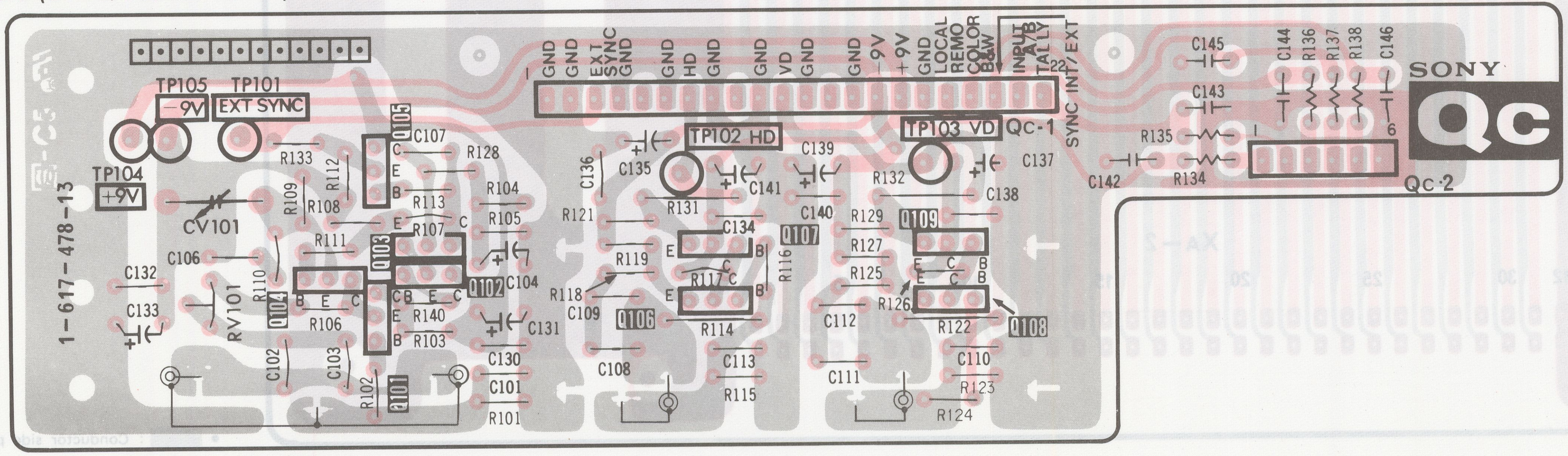
QA board (RGB INPUT)


QA
1-617-476-13
SONY
QA-1
GND GND G/Y GND B/PB GND R/PR GND -9V +9V GND
TP101 G/Y
TP102 B/PB
TP103 R/PR
TP104 +9V
TP105 -9V
CV101
CV102
CV103
RV101
RV102
RV103
Q101 Q102 Q103 Q104 Q105 Q106 Q107 Q108 Q109 Q110 Q111 Q112 Q113 Q114 Q115
R101 R102 R103 R104 R105 R106 R107 R108 R109 R110 R111 R112 R113 R114 R115 R116 R117 R118 R119 R120 R121 R122 R123 R124 R125 R126 R127 R128 R129 R130 R131 R132 R133 R134 R135 R136 R137 R138 R139 R140 R141 R142 R143 R144 R145 R146 R147 R148
C101 C102 C103 C104 C105 C106 C107 C108 C109 C110 C111 C112 C113 C114 C115 C116 C117 C118 C128 C129 C130 C131 C132 C133 C134 C135 C136 C137 C138 C139
E B C
1
15

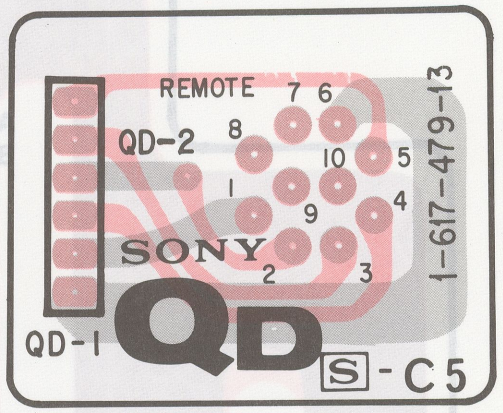
QB board (RGB INPUT)


QB
1-617-477-13
SONY
QB-1
GND GND G/Y GND B/PB GND R/PR GND -9V +9V GND
TP101 G/Y
TP102 B/PB
TP103 R/PR
TP104 +9V
TP105 -9V
CV101
CV102
CV103
RV101
RV102
RV103
Q101 Q102 Q103 Q104 Q105 Q106 Q107 Q108 Q109 Q110 Q111 Q112 Q113 Q114 Q115
R101 R102 R103 R104 R105 R106 R107 R108 R109 R110 R111 R112 R113 R114 R115 R116 R117 R118 R119 R120 R121 R122 R123 R124 R125 R126 R127 R128 R129 R130 R131 R132 R133 R134 R135 R136 R137 R138 R139 R140 R141 R142 R143 R144 R145 R146 R147 R148
C101 C102 C103 C104 C105 C106 C107 C108 C109 C110 C111 C112 C113 C114 C115 C116 C117 C118 C128 C129 C130 C131 C132 C133 C134 C135 C136 C137 C138 C139
E B C

QC board (SYNC/HD/VD INPUT)

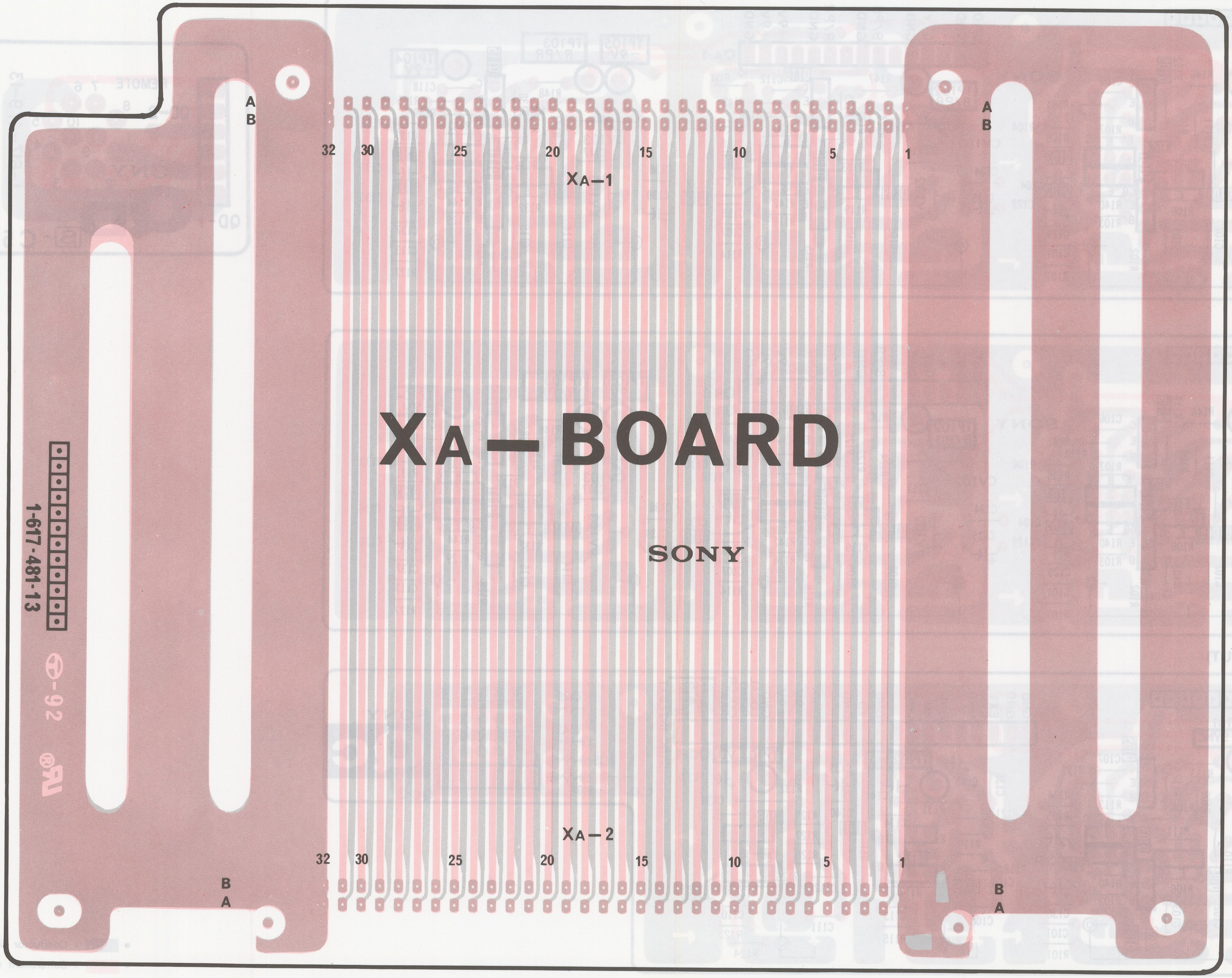

QC
1-617-478-13
SONY
QC-1
QC-2
GND GND EXT SYNC GND GND HD GND GND VD GND GND -9V +9V GND LOCAL REMO COLOR B&W INPUT A B TALLY
SYNC INT/EXT
22
1
6
TP101 EXT SYNC
TP102 HD
TP103 VD
TP104 +9V
TP105 -9V
CV101
RV101
Q101 Q102 Q103 Q104 Q105 Q106 Q107 Q108 Q109
R101 R102 R103 R104 R105 R106 R107 R108 R109 R110 R111 R112 R113 R114 R115 R116 R117 R118 R119 R121 R122 R123 R124 R125 R126 R127 R128 R129 R131 R132 R133 R134 R135 R136 R137 R138 R140
C101 C102 C103 C104 C106 C107 C108 C109 C110 C111 C112 C113 C130 C131 C132 C133 C134 C135 C136 C137 C138 C139 C140 C141 C142 C143 C144 C145 C146
E B C

QD board (REMOTE CONTROL INPUT)


QD
S-C5
1-617-479-13
SONY
REMOTE
QD-1
QD-2
1 2 3 4 5 6 7 8 9 10

● ▨ : Conductor side pattern
● 🟥 : Component side pattern

XA board (EXTENSION BOARD)


A
B
32
30
25
20
15
10
5
1
XA–1
XA–BOARD
SONY
1-617-481-13
-92
XA–2
B
A

- ▨ : Conductor side pattern
- 🟥 : Component side pattern

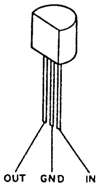
5-4. SEMICONDUCTOR PIN ASSIGNMENTS

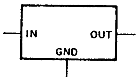
The chart in this section may sometimes show diodes, transistors, and ICs that are not interchangeable. When replacing a component, be sure to refer to the parts list. The circuit diagram of each IC is obtained from the IC data book published by the manufacturer.

TYPE	PAGE
1S1585	5-97
1S2076A	5-97
1SS119	5-97
1SS83	5-97
2SA1005	5-97
2SA1048	5-97
2SA1156	5-97
2SA1175	5-97
2SA1206	5-97
2SA1208	5-97
2SA1282	5-97
2SA1380	5-97
2SA1407	5-97
2SA893A	5-97
2SA979	5-97
2SB739	5-97
2SB740	5-97
2SB860	5-97
2SC1890A	5-97
2SC2278	5-97
2SC2362K	5-97
2SC2471	5-97
2SC2551	5-97
2SC2570A	5-97
2SC2688	5-97
2SC2752	5-97
2SC2785	5-97
2SC2878	5-97
2SC2910	5-97
2SC3263	5-97
2SC3387	5-97
2SC3502	5-97
2SC3595	5-97
2SC3601	5-97
2SC3623A	5-97
2SC403SP	5-97
2SC4532	5-97
2SD1137	5-97
2SD1138	5-97
2SD669A	5-97
2SD788	5-97
2SD789	5-97
2SD982	5-97
2SK125	5-97
2SK523	5-97
AN78L04	5-88
BX1190	5-88
BX1313	5-88
BX1314	5-88
BX1315	5-88
CR02AM-4	5-97
CR02AM-8	5-97
CR3CM-8	5-97
CTL-12S	5-97
CTL-22S	5-97
DTA124ES	5-97
DTC114ES	5-97
DTC124ES	5-97
ERC06-15SA	5-97
ERC38-06	5-97
ERD28-08S	5-97
ERD31-04	5-97
GL-3HY8	5-97
HZT33-02	5-97
HZT33-02	5-97
LA7016	5-88
LM2903DQ	5-88
LM7805CT	5-89
LM7812CT	5-89
LT-9220H	5-97
M5230L	5-89
M5F7805	5-89
MB7053	5-89
MB7116H	5-89
MB7138E	5-90
MBM2764	5-90
MC14011BCP	5-90
MC14053BCP	5-90
MC1495L	5-91
MC1496P	5-91
MC74HC4053N	5-91
MC74HC74N	5-91
NJM7805A	5-89
NJM7912A	5-91
PC817	5-97
RB406N	5-97
RC4558DQ	5-91
RC4558P	5-91
RC7812FA	5-92
RC78L05A	5-88
RC78L09A	5-88
RC79L08A	5-92
RD10EB2	5-97
RD10EL2	5-97
RD10ESB2	5-97
RD11EB2	5-97
RD11ESB	5-97
RD11ESB2	5-97
RD13EB3	5-97
RD13ESB2	5-97
RD15EB2	5-97
RD15ESB2	5-97
RD3.9EB1	5-97
RD3.9ESB2	5-97
RD4.7EB2	5-97
RD4.7ESB2	5-97
RD5.1EB2	5-97
RD5.1ESB2	5-97
RD5.6EB1	5-97
RD5.6EB2	5-97
RD5.6ESB2	5-97
RD6.2EB1	5-97
RD6.2EL2	5-97
RD6.2ESB2	5-97
RD8.2ESB2	5-97
RD9.1EB1	5-97
RD9.1EB2	5-97
RD9.1ESB2	5-97
RH-1	5-97
RH-1A	5-97
S3WB60Z	5-97
SG264A	5-97
SI-3122V	5-92
SN7406N	5-92
SN7407N	5-92
SN74HC05N	5-92
SN74HC153N	5-92
SN74HC36N	5-93
SN74HC393N	5-93
SN74LS00N	5-93
SN74LS08N	5-93
SN74LS137N	5-93
SN74LS161AN	5-93
SN74LS163AN	5-94
SN74LS175N	5-94
SN74LS32N	5-94
SN74LS86AN	5-94
SN74S00N	5-93
SN74S163N	5-94
SN74S374N	5-94
TC4011BP	5-90
TC4053BP	5-90
TC5024BP	5-94
TC5025BP	5-94
TC74HC00P	5-95
TC74HC112P	5-95
TC74HC153P	5-92
TC74HC193P	5-95
TC74HC393P	5-93
TC74HC4538P	5-95
TC74HC74P	5-91
TL082CP	5-95
TLG124A	5-97
TLY124	5-97
TX429M	5-97
μPC1377C	5-96
μPC311C	5-96
μPC574J	5-96
μPC7805H	5-89
μPC7812H	5-89
μPC78L05J	5-88
μPC7912H	5-91
μPC814C	5-96
μPD4011BC	5-90
μPD4053BC	5-90
V19C	5-97
V19CSS	5-97
V19E	5-97
V19EF1	5-97
V19GF1	5-97

AN78L04 (MATSUSHITA)
RC78L05A (RAYTHEON)
RC78L09A (RAYTHEON)
uPC78L05J (NEC)

POSITIVE VOLTAGE REGULATOR (100mA)

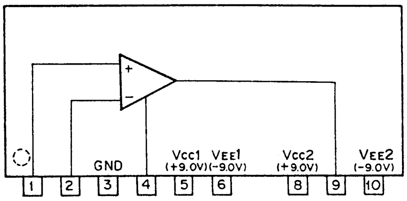




OUTPUT VOLTAGE	NJM78L??A	RC78L??A	uA78L??ACL	uA78L??AWV	uPC78L??J	AN78L??
+2.6V	NJM78L02A	RC78L02A	uA78L02ACL	uA78L26AWV	---------	-------
+4V	---------	--------	----------	----------	---------	AN78L04
+5V	NJM78L05A	RC78L05A	uA78L05ACL	uA78L05AWV	uPC78L05J	AN78L05
+6V	NJM78L06A	RC78L06A	----------	----------	---------	AN78L06
+6.2V	---------	--------	uA78L06ACL	uA78L62AWV	---------	-------
+7V	---------	--------	----------	----------	---------	AN78L07
+8V	NJM78L08A	RC78L08A	uA78L08ACL	----------	uPC78L08J	AN78L08
+8.2V	---------	--------	----------	uA78L82AWV	---------	-------
+9V	NJM78L09A	RC78L09A	uA78L09ACL	uA78L09AWV	---------	AN78L09
+10V	---------	--------	uA78L10ACL	----------	uPC78L10J	AN78L10
+12V	NJM78L12A	RC78L12A	uA78L12ACL	uA78L12AWV	uPC78L12J	AN78L12
+15V	NJM78L15A	RC78L15A	uA78L15ACL	uA78L15AWV	uPC78L15J	AN78L15
+18V	NJM78L18A	RC78L18A	----------	uA78L18AWV	---------	AN78L18
+20V	NJM78L20A	RC78L20A	----------	----------	---------	AN78L20
+24V	NJM78L24A	RC78L24A	----------	uA78L24AWV	---------	AN78L24

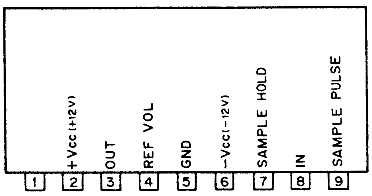
BX1190 (SONY)

VIDEO AMPLIFIER
- REAR VIEW -


+
−
GND
Vcc1 VEE1
(+9.0V)(-9.0V)
Vcc2
(+9.0V)
VEE2
(-9.0V)
1
2
3
4
5
6
8
9
10

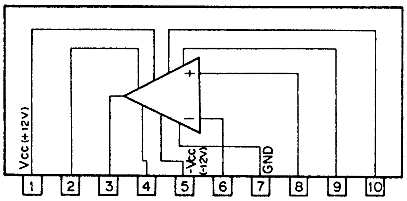
BX1313

SAMPLE HOLD
- PRINTED SIDE VIEW -


+Vcc (+12V)
OUT
REF VOL
GND
−Vcc (−12V)
SAMPLE HOLD
IN
SAMPLE PULSE
1
2
3
4
5
6
7
8
9

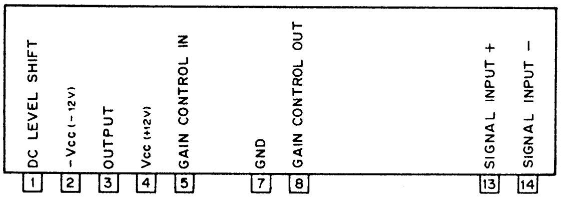
BX1314

VIDEO BUFFER AMPLIFIER
- PRINTED SIDE VIEW -


+
−
Vcc (+12V)
-Vcc
(-12V)
GND
1
2
3
4
5
6
7
8
9
10

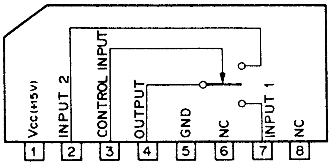
BX1315

GAIN CONTROLLER AND LEVEL SHIFT
- PRINTED SIDE VIEW -


DC LEVEL SHIFT
−Vcc (−12V)
OUTPUT
Vcc (+12V)
GAIN CONTROL IN
GND
GAIN CONTROL OUT
SIGNAL INPUT +
SIGNAL INPUT −
1
2
3
4
5
7
8
13
14

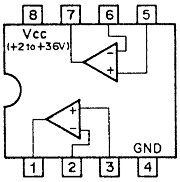
LA7016 (SANYO)

ELECTRICAL SWITCH
- PRINTED SIDE VIEW -


Vcc (+15V)
INPUT 2
CONTROL INPUT
OUTPUT
GND
NC
INPUT 1
NC
1
2
3
4
5
6
7
8

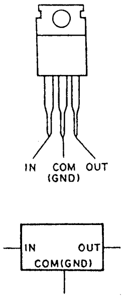
LM2903DQ (RAYTHEON)

DUAL VOLTAGE COMPARATORS
- TOP VIEW -


8
7
6
5
Vcc
(+2 to +36V)
−
+
+
−
GND
1
2
3
4

LM7805CT (RAYTHEON)
LM7812CT (RAYTHEON)
NJM7805A (JRC)
uPC7805H (NEC)
uPC7812H (NEC)

POSITIVE VOLTAGE REGULATOR (1A)
– SIDE VIEW –



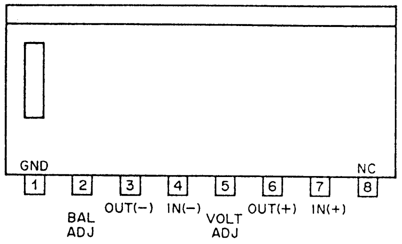
IN
COM (GND)
OUT
IN
OUT
COM(GND)

OUTPUT VOLTAGE	AN78??	FS78??	HA178??P	L78??	NJM78??B	NJM78??A/K
+5V	AN7805	FS7805	HA17805P	L7805	--------	NJM7805A/K
+6V	AN7806	------	HA17806P	-----	--------	NJM7806A/K
+7V	AN7807	------	HA17807P	L7807	--------	----------
+8V	AN7808	------	HA17808P	-----	--------	NJM7808A/K
+8.5V	------	------	--------	-----	--------	----------
+9V	AN7809	------	--------	-----	--------	NJM7809A/K
+10V	AN7810	------	--------	-----	--------	----------
+12V	AN7812	FS7812	HA17812P	-----	NJM7812B	NJM7812A/K
+15V	AN7815	FS7815	HA17815P	-----	--------	NJM7815A/K
+18V	AN7818	------	HA17818P	-----	--------	NJM7818A/K
+20V	AN7820	------	--------	-----	--------	NJM7820A/K
+24V	AN7824	FS7824	HA17824P	-----	--------	NJM7824A/K

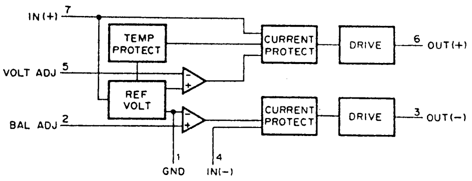
OUTPUT VOLTAGE	uA78??UC	uPC143??H	uPC78??H	TA78???P/AP
+5V	uA7805UC	uPC14305H	uPC7805H	TA78005P/AP
+6V	uA7806UC	---------	--------	TA78006P/AP
+7V	--------	---------	--------	---------
+8V	uA7808UC	uPC14308H	uPC7808H	TA78008P/AP
+8.5V	uA7885UC	---------	--------	---------
+9V	--------	---------	--------	TA78009P/AP
+10V	--------	---------	--------	TA78010P/AP
+12V	uA7812UC	uPC14312H	uPC7812H	TA78012P/AP
+15V	uA7815UC	uPC14315H	uPC7815H	TA78015P/AP
+18V	uA7818UC	uPC14318H	uPC7818H	TA78018P/AP
+20V	--------	---------	--------	TA78020P/AP
+24V	uA7824UC	uPC14324H	uPC7824H	TA78024P/AP

M5230L (MITSUBISHI)

VOLTAGE REG.(TRACKING TYPE)
– PRINTED SIDE VIEW –



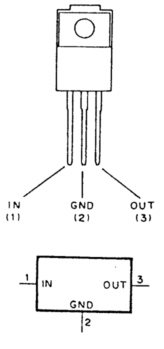
GND
NC
1
2
3
4
5
6
7
8
BAL ADJ
OUT(–)
IN(–)
VOLT ADJ
OUT(+)
IN(+)



IN(+) 7
TEMP PROTECT
CURRENT PROTECT
DRIVE
6 OUT(+)
VOLT ADJ 5
REF VOLT
BAL ADJ 2
CURRENT PROTECT
DRIVE
3 OUT(–)
1 GND
4 IN(–)

M5F7805 (MITSUBISHI)

POSITIVE VOLTAGE REGULATOR (1A)
– PRINTED SIDE VIEW –

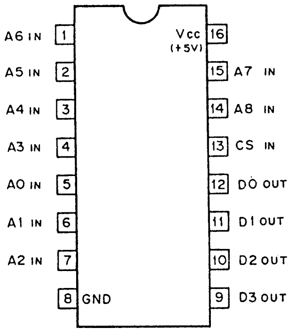


IN (1)
GND (2)
OUT (3)
1 IN
OUT 3
GND
2

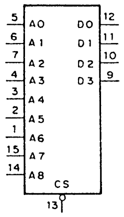
+5V	M5F7805
+6V	M5F7806
+7V	M5F7807
+8V	M5F7808
+9V	M5F7809
+10V	M5F7810
+12V	M5F7812
+15V	M5F7815
+18V	M5F7818
+20V	M5F7820
+24V	M5F7824

MB7053 (FUJITSU)

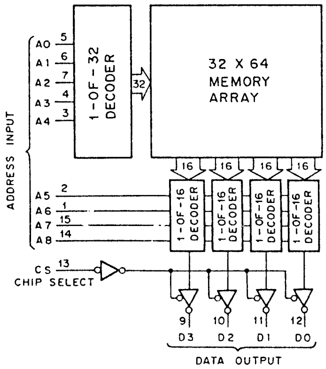
2048-BIT (512x4) PROM (3-STATE OUTPUT)
– TOP VIEW –



A6 IN 1
A5 IN 2
A4 IN 3
A3 IN 4
A0 IN 5
A1 IN 6
A2 IN 7
8 GND
Vcc (+5V) 16
15 A7 IN
14 A8 IN
13 CS IN
12 D0 OUT
11 D1 OUT
10 D2 OUT
9 D3 OUT



5 A0
6 A1
7 A2
4 A3
3 A4
2 A5
1 A6
15 A7
14 A8
D0 12
D1 11
D2 10
D3 9
CS
13



ADDRESS INPUT
A0 5
A1 6
A2 7
A3 4
A4 3
1-OF-32 DECODER
32
32 X 64 MEMORY ARRAY
16
16
16
16
A5 2
A6 1
A7 15
A8 14
1-OF-16 DECODER
1-OF-16 DECODER
1-OF-16 DECODER
1-OF-16 DECODER
CS 13
CHIP SELECT
9
10
11
12
D3
D2
D1
D0
DATA OUTPUT

OUTPUT MODE

CHIP SEL CS	OUTPUT
0	ENABLE
1	HI-IMPEDANCE

0; LOW LEVEL
1; HIGH LEVEL

WORD/ADDRESS TABLE

WORD		ADDRESS INPUTS								
		A8	A7	A6	A5	A4	A3	A2	A1	A0
0	000	0	0	0	0	0	0	0	0	0
1	001	0	0	0	0	0	0	0	0	1
2	002	0	0	0	0	0	0	0	1	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
9	009	0	0	0	0	0	1	0	0	1
10	00A	0	0	0	0	0	1	0	1	0
11	00B	0	0	0	0	0	1	0	1	1
12	00C	0	0	0	0	0	1	1	0	0
13	00D	0	0	0	0	0	1	1	0	1
14	00E	0	0	0	0	0	1	1	1	0
15	00F	0	0	0	0	0	1	1	1	1
16	010	0	0	0	0	1	0	0	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
509	1FD	1	1	1	1	1	1	1	0	1
510	1FE	1	1	1	1	1	1	1	1	0
511	1FF	1	1	1	1	1	1	1	1	1

IN HEXADECIMAL
IN DECIMAL

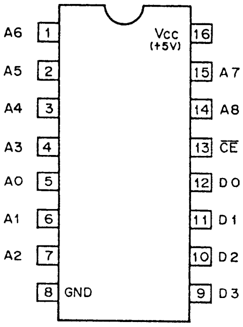
DATA CODE / ACTUAL DATA

DATA CODE		ACTUAL DATA			
		D3	D2	D1	D0
0	0	0	0	0	0
1	1	0	0	0	1
2	2	0	0	1	0
3	3	0	0	1	1
4	4	0	1	0	0
5	5	0	1	0	1
6	6	0	1	1	0
7	7	0	1	1	1
8	8	1	0	0	0
9	9	1	0	0	1
10	A	1	0	1	0
11	B	1	0	1	1
12	C	1	1	0	0
13	D	1	1	0	1
14	E	1	1	1	0
15	F	1	1	1	1

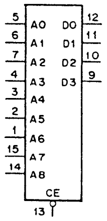
IN HEXADECIMAL
IN DECIMAL

MB7116H (FUJITSU) (ACCESS TIME = 35nS)

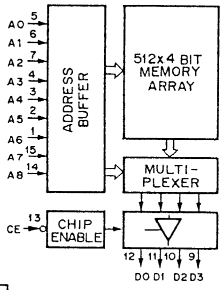
2048-BIT (512x4) PROM WITH 3-STATE OUTPUTS
– TOP VIEW –



A6 1
A5 2
A4 3
A3 4
A0 5
A1 6
A2 7
8 GND
Vcc (+5V) 16
15 A7
14 A8
13 CE
12 D0
11 D1
10 D2
9 D3



5 A0
6 A1
7 A2
4 A3
3 A4
2 A5
1 A6
15 A7
14 A8
D0 12
D1 11
D2 10
D3 9
CE
13



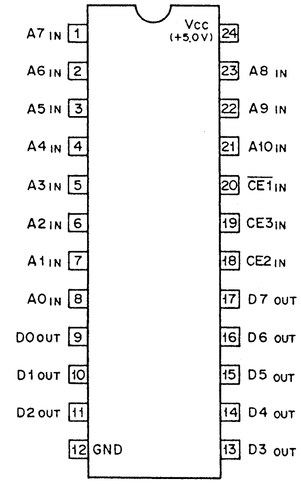
A0 5
A1 6
A2 7
A3 4
A4 3
A5 2
A6 1
A7 15
A8 14
ADDRESS BUFFER
512x4 BIT MEMORY ARRAY
MULTI-PLEXER
CE 13
CHIP ENABLE
12
11
10
9
D0 D1 D2 D3

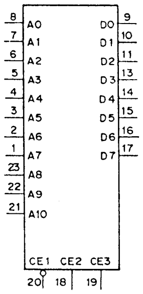
CE	OUTPUT
0	ENABLE
1	HI-Z

A0-A8; ADDRESS INPUTS
D0-D3; DATA OUTPUTS
CE ; CHIP ENABLE INPUT

0 ; LOW LEVEL
1 ; HIGH LEVEL
HI-Z ; HIGH IMPEDANCE

MB7138E (FUJITSU) (ACCESS TIME = 55nS)
16384-BIT (2048x8) PROM WITH 3-STATE OUTPUTS
– TOP VIEW –


A7 IN 1
A6 IN 2
A5 IN 3
A4 IN 4
A3 IN 5
A2 IN 6
A1 IN 7
A0 IN 8
D0 OUT 9
D1 OUT 10
D2 OUT 11
12 GND
Vcc (+5.0V) 24
23 A8 IN
22 A9 IN
21 A10 IN
20 $\overline{CE1}$ IN
19 CE3 IN
18 CE2 IN
17 D7 OUT
16 D6 OUT
15 D5 OUT
14 D4 OUT
13 D3 OUT


8 A0
7 A1
6 A2
5 A3
4 A4
3 A5
2 A6
1 A7
23 A8
22 A9
21 A10
D0 9
D1 10
D2 11
D3 13
D4 14
D5 15
D6 16
D7 17
CE1 CE2 CE3
20 18 19

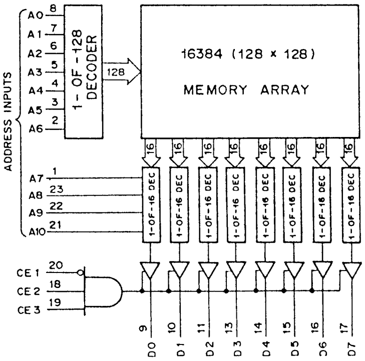
WORD / ADDRESS TABLE

WORD	ADDRESS INPUT										
	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	1	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
2045	1	1	1	1	1	1	1	1	1	0	1
2046	1	1	1	1	1	1	1	1	1	1	0
2047	1	1	1	1	1	1	1	1	1	1	1

DATA CODE / ACTUAL DATA

DATA CODE		ACTUAL DATA							
		D7	D6	D5	D4	D3	D2	D1	D0
0	00	0	0	0	0	0	0	0	0
1	01	0	0	0	0	0	0	0	1
2	02	0	0	0	0	0	0	1	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
8	08	0	0	0	0	1	0	0	0
9	09	0	0	0	0	1	0	0	1
10	0A	0	0	0	0	1	0	1	0
11	0B	0	0	0	0	1	0	1	1
12	0C	0	0	0	0	1	1	0	0
13	0D	0	0	0	0	1	1	0	1
14	0E	0	0	0	0	1	1	1	0
15	0F	0	0	0	0	1	1	1	1
16	10	0	0	0	1	0	0	0	0
17	11	0	0	0	1	0	0	0	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
238	EE	1	1	1	0	1	1	1	0
239	EF	1	1	1	0	1	1	1	1
240	F0	1	1	1	1	0	0	0	0
241	F1	1	1	1	1	0	0	0	1
242	F2	1	1	1	1	0	0	1	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
248	F8	1	1	1	1	1	0	0	0
249	F9	1	1	1	1	1	0	0	1
250	FA	1	1	1	1	1	0	1	0
251	FB	1	1	1	1	1	0	1	1
252	FC	1	1	1	1	1	1	0	0
253	FD	1	1	1	1	1	1	0	1
254	FE	1	1	1	1	1	1	1	0
255	FF	1	1	1	1	1	1	1	1

IN DECIMAL
IN HEXADECIMAL

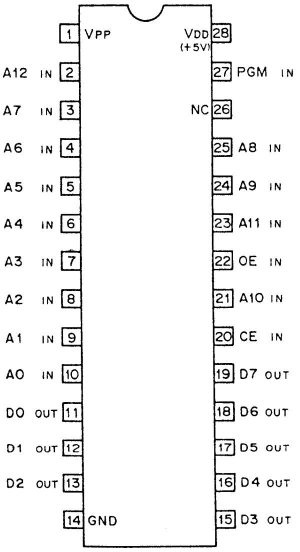

A0 8
A1 7
A2 6
A3 5
A4 4
A5 3
A6 2
ADDRESS INPUTS
1-OF-128 DECODER
128
16384 (128 × 128)
MEMORY ARRAY
16
1-OF-16 DEC
A7 1
A8 23
A9 22
A10 21
CE1 20
CE2 18
CE3 19
9 D0
10 D1
11 D2
13 D3
14 D4
15 D5
16 D6
17 D7

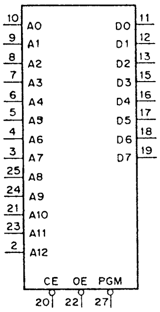
CHIP SEL			OUTPUT
CE1	CE2	CE3	
0	1	1	ENABLE
1	0	X	HI- IMPEDANCE
1	X	0	

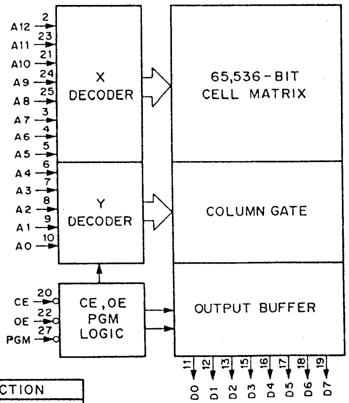
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

MBM2764 (FUJITSU)

N-MOS 64K (8K-8) ERASABLE PROM WITH 3-STATE OUTPUTS
– TOP VIEW –


1 VPP
A12 IN 2
A7 IN 3
A6 IN 4
A5 IN 5
A4 IN 6
A3 IN 7
A2 IN 8
A1 IN 9
A0 IN 10
D0 OUT 11
D1 OUT 12
D2 OUT 13
14 GND
VDD (+5V) 28
27 PGM IN
NC 26
25 A8 IN
24 A9 IN
23 A11 IN
22 OE IN
21 A10 IN
20 CE IN
19 D7 OUT
18 D6 OUT
17 D5 OUT
16 D4 OUT
15 D3 OUT


10 A0
9 A1
8 A2
7 A3
6 A4
5 A5
4 A6
3 A7
25 A8
24 A9
21 A10
23 A11
2 A12
D0 11
D1 12
D2 13
D3 15
D4 16
D5 17
D6 18
D7 19
CE OE PGM
20 22 27


A12 2
A11 23
A10 21
A9 24
A8 25
A7 3
A6 4
A5 5
A4 6
A3 7
A2 8
A1 9
A0 10
X DECODER
Y DECODER
65,536-BIT CELL MATRIX
COLUMN GATE
CE 20
OE 22
PGM 27
CE, OE PGM LOGIC
OUTPUT BUFFER
11 D0
12 D1
13 D2
15 D3
16 D4
17 D5
18 D6
19 D7

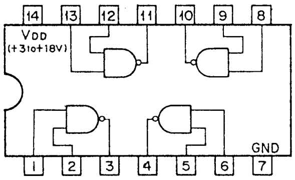
A0–A12 ; ADDRESS
CE ; CHIP ENABLE
D0–D7 ; DATA OUTPUT
OE ; OUTPUT ENABLE
PGM ; PROGRAM ENABLE
VPP ; PROGRAM VOLTAGE

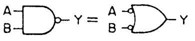
An	CE	OE	PGM	VPP	Dn	FUNCTION
An	0	0	1	+5V	DENTERED	READ
An	0	1	1	+5V	HI-Z	OUTPUT DISABLE
An	0	0	0	+5V	HI-Z	OUTPUT DISABLE
X	1	X	X	+5V	HI-Z	STANDBY
An	0	X	⊔	+21V	DIN	PGM
An	0	0	1	+21V	DENTERED	PGM VERIFY
X	1	X	X	+21V	HI-Z	PGM INH

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH INPEDANCE

MC14011BCP (MOTOROLA)
TC4011BP (TOSHIBA)
uPD4011BC (NEC)

C-MOS 2-INPUT NAND GATE
– TOP VIEW –


14 13 12 11 10 9 8
VDD (+3 to +18V)
GND
1 2 3 4 5 6 7



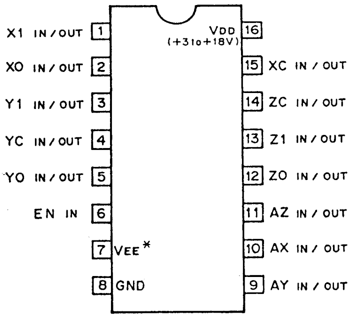
$Y = \overline{A \cdot B} = \overline{A} + \overline{B}$

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

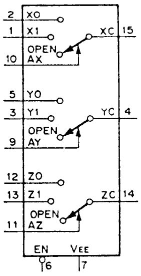
0;LOW LEVEL
1;HIGH LEVEL

MC14053BCP (MOTOROLA)
TC4053BP (TOSHIBA)
uPD4053BC (NEC)

C-MOS TRIPLE 2-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER
– TOP VIEW –


X1 IN/OUT 1
X0 IN/OUT 2
Y1 IN/OUT 3
YC IN/OUT 4
Y0 IN/OUT 5
EN IN 6
7 VEE*
8 GND
VDD (+3 to +18V) 16
15 XC IN/OUT
14 ZC IN/OUT
13 Z1 IN/OUT
12 Z0 IN/OUT
11 AZ IN/OUT
10 AX IN/OUT
9 AY IN/OUT

VEE*; VDD – VEE = +3 to +18 V

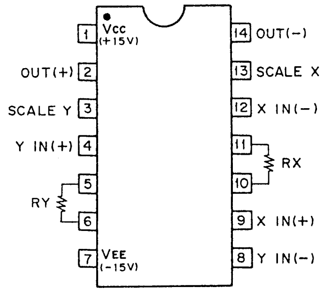

2 X0
1 X1
XC 15
OPEN
10 AX
5 Y0
3 Y1
YC 4
OPEN
9 AY
12 Z0
13 Z1
ZC 14
OPEN
11 AZ
EN VEE
6 7

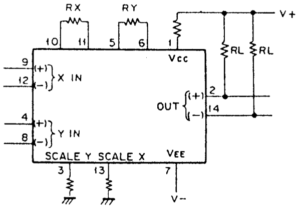
CONT. INPUTS		ON CHANNEL
EN	A (X,Y,Z,)	
0	0	0
0	1	1
1	X	OPEN

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE.

MC1495L (MOTOROLA)

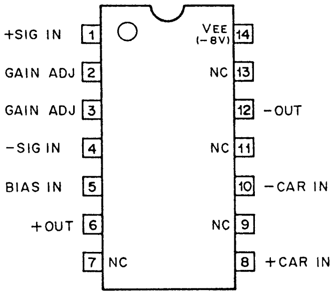
FOUR-QUADRANT MULTIPLIER
- TOP VIEW -

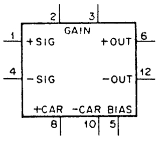

1 Vcc (+15V)
OUT(+) 2
SCALE Y 3
Y IN(+) 4
RY 5 6
7 VEE (-15V)
14 OUT(-)
13 SCALE X
12 X IN(-)
11 10 RX
9 X IN(+)
8 Y IN(-)


RX
RY
V+
RL
RL
Vcc
X IN
Y IN
OUT
SCALE Y SCALE X
VEE
V-

MC1496P (MOTOROLA)

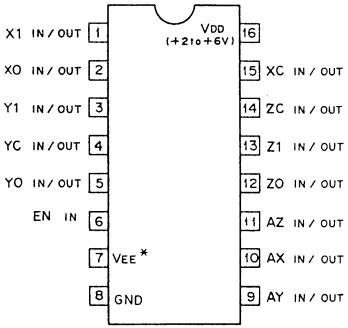
BALANCED MODULATOR/DEMODULATOR
- TOP VIEW -

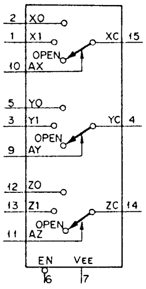

+SIG IN 1
GAIN ADJ 2
GAIN ADJ 3
-SIG IN 4
BIAS IN 5
+OUT 6
7 NC
14 VEE (-8V)
13 NC
12 -OUT
11 NC
10 -CAR IN
9 NC
8 +CAR IN


GAIN
+SIG
+OUT
-SIG
-OUT
+CAR -CAR BIAS

MC74HC4053N (MOTOROLA)

C-MOS TRIPLE 2-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER
- TOP VIEW -


X1 IN/OUT 1
XO IN/OUT 2
Y1 IN/OUT 3
YC IN/OUT 4
YO IN/OUT 5
EN IN 6
7 VEE*
8 GND
16 VDD (+2 to +6V)
15 XC IN/OUT
14 ZC IN/OUT
13 Z1 IN/OUT
12 ZO IN/OUT
11 AZ IN/OUT
10 AX IN/OUT
9 AY IN/OUT


XO
X1
XC
OPEN
AX
YO
Y1
YC
OPEN
AY
ZO
Z1
ZC
OPEN
AZ
EN
VEE

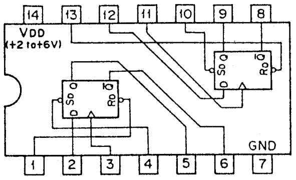
VEE*; VDD−VEE = +3 to +12V
VEE ≦ GND

CONT. INPUTS		ON CHANNEL
EN	A (X,Y,Z,)	
0	0	0
0	1	1
1	X	OPEN

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE.

MC74HC74N (MOTOROLA)
TC74HC74P (TOSHIBA)

C-MOS D-TYPE FLIP FLOP WITH DIRECT SET/RESET
- TOP VIEW -

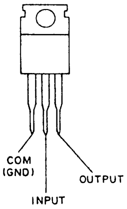

14 13 12 11 10 9 8
VDD (+2 to +6V)
D SD Q
RD Q̄
GND
1 2 3 4 5 6 7

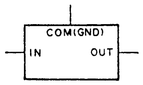
INPUTS				OUTPUTS	
$\overline{S_D}$	$\overline{R_D}$	CK	D	Qn+1	$\overline{Qn+1}$
0	1	X	X	1	0
1	0	X	X	0	1
0	0	X	X	1	1
1	1	↑	1	1	0
1	1	↑	0	0	1
1	1	0	X	Qn	$\overline{Qn}$

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

NJM7912A (JRC)
uPC7912H (NEC)

NEGATIVE VOLTAGE REGULATOR (1A)
- SIDE VIEW -


COM (GND)
OUTPUT
INPUT

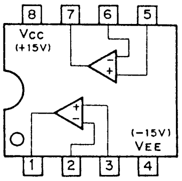

COM(GND)
IN
OUT

OUTPUT VOLTAGE	AN79??	FS79??	uA79??UC	uPC79??H	MC79??CT
-2V	------	------	--------	--------	MC7902CT
-5V	AN7905	FS7905	uA7905UC	uPC7905H	MC7905CT
-5.2V	------	------	--------	--------	MC7905.2CT
-6V	AN7906	------	uA7906UC	--------	MC7906CT
-7V	AN7907	------	--------	--------	--------
-8V	AN7908	------	uA7908UC	uPC7908H	MC7908CT
-9V	AN7909	------	--------	--------	--------
-10V	AN7910	------	--------	--------	--------
-12V	AN7912	------	uA7912UC	uPC7912H	MC7912CT
-15V	AN7915	------	uA7915UC	uPC7915H	MC7915CT
-18V	AN7918	------	uA7918UC	uPC7918H	MC7918CT
-20V	AN7920	------	--------	--------	--------
-24V	AN7924	------	uA7924UC	uPC7924H	MC7924CT

OUTPUT VOLTAGE	NJM79??A
-2V	--------
-5V	NJM7905A
-5.2V	--------
-6V	NJM7906A
-7V	--------
-8V	NJM7908A
-9V	NJM7909A
-10V	--------
-12V	NJM7912A
-15V	NJM7915A
-18V	NJM7918A
-20V	--------
-24V	NJM7924A

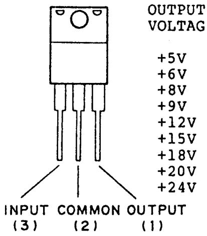
RC4558DQ (RAYTHEON)
RC4558P (TI)

OPERATIONAL AMPLIFIER
- TOP VIEW -

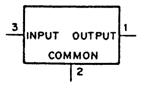

8 7 6 5
Vcc (+15V)
(-15V) VEE
1 2 3 4

RC7812FA (TI)

POSITIVE VOLTAGE REGULATOR
- FRONT VIEW -

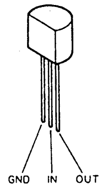

INPUT
COMMON
OUTPUT
(3)
(2)
(1)

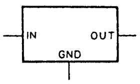
OUTPUT VOLTAGE	NJM78M??FA	NJM78??FA	RC78M??FA	RC78??FA
+5V	NJM78M05FA	NJM7805FA	RC78M05FA	RC7805FA
+6V	NJM78M06FA	NJM7806FA	RC78M06FA	RC7806FA
+8V	NJM78M08FA	NJM7808FA	---------	RC7808FA
+9V	NJM78M09FA	NJM7809FA	RC78M09FA	RC7809FA
+12V	NJM78M12FA	NJM7812FA	RC78M12FA	RC7812FA
+15V	NJM78M15FA	NJM7815FA	RC78M15FA	RC7815FA
+18V	NJM78M18FA	NJM7818FA	---------	RC7818FA
+20V	NJM78M20FA	NJM7820FA	---------	RC7820FA
+24V	NJM78M24FA	NJM7824FA	---------	RC7824FA


3
INPUT
OUTPUT
1
COMMON
2

RC79L08A (RAYTHEON)

NEGATIVE VOLTAGE REGULATOR (100mA)
- FRONT VIEW -

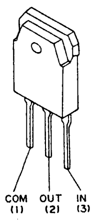




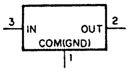
OUTPUT VOLTAGE	NJM79L??A	RC79L??A	AN79L??
-3V	NJM79L03A	RC79L03A	-------
-4V	---------	--------	AN79L04
-5V	NJM79L05A	RC79L05A	AN79L05
-6V	NJM79L06A	RC79L06A	AN79L06
-7V	---------	--------	AN79L07
-8V	NJM79L08A	RC79L08A	AN79L08
-9V	NJM79L09A	RC79L09A	AN79L09
-10V	---------	--------	AN79L10
-12V	NJM79L12A	RC79L12A	AN79L12
-15V	NJM79L15A	RC79L15A	AN79L15
-18V	NJM79L18A	RC79L18A	AN79L18
-20V	---------	--------	AN79L20
-24V	NJM79L24A	RC79L24A	AN79L24

SI-3122V (SANKEN)

POSITIVE VOLTAGE REGULATOR (2A)

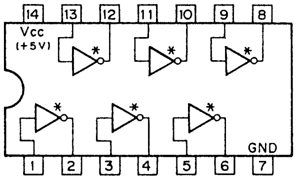

COM
OUT
IN
(1)
(2)
(3)

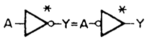
5V	SI-3052V
12V	SI-3122V


3
IN
OUT
2
COM(GND)
1

SN7406N (TI)

TTL INVERTER BUFFER/DRIVER WITH OPEN-COLLECTOR
- TOP VIEW -


14
13
12
11
10
9
8
Vcc
(+5V)
GND
1
2
3
4
5
6
7



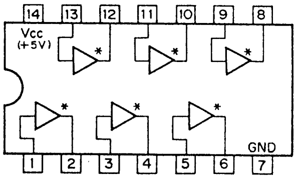
Y = Ā

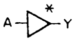
A	Y
0	1
1	0

0; LOW LEVEL
1; HIGH LEVEL
*; OPEN COLLECTOR

SN7407N (TI)

TTL BUFFER/DRIVER WITH OPEN-COLLECTOR
- TOP VIEW -


14
13
12
11
10
9
8
Vcc
(+5V)
GND
1
2
3
4
5
6
7



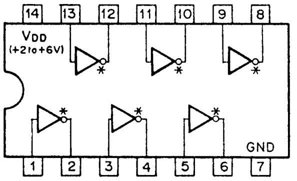
Y = A

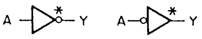
A	Y
0	0
1	1

0 ; LOW LEVEL
1 ; HIGH LEVEL
* ; OPEN COLLECTOR

SN74HC05N (TI)

C-MOS HEX INVERTER WITH OPEN-DRAIN
- TOP VIEW -


14
13
12
11
10
9
8
VDD
(+2to+6V)
GND
1
2
3
4
5
6
7



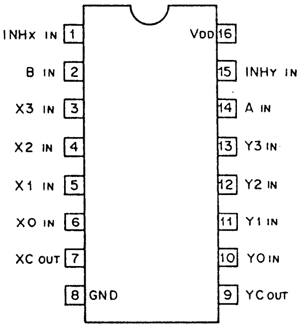
Y=Ā

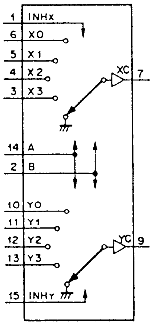
A	Y
0	1
1	0

0; LOW LEVEL
1; HIGH LEVEL
*; OPEN DRAIN

SN74HC153N (TI) ($V_{DD}=+2$ to $+6V$)
TC74HC153P (TOSHIBA) ($V_{DD}=+2$ to $+6V$)

C-MOS DUAL 4-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER
- TOP VIEW -


INHx IN 1
B IN 2
X3 IN 3
X2 IN 4
X1 IN 5
X0 IN 6
XC OUT 7
8 GND
VDD 16
15 INHY IN
14 A IN
13 Y3 IN
12 Y2 IN
11 Y1 IN
10 Y0 IN
9 YC OUT

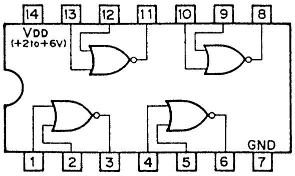

1 INHx
6 X0
5 X1
4 X2
3 X3
XC 7
14 A
2 B
10 Y0
11 Y1
12 Y2
13 Y3
YC 9
15 INHY

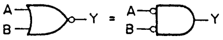
CONTROL IN			ON CHANNEL
INH	B	A	
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	X	X	GND

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

SN74HC36N (TI)

C-MOS 2-INPUT NOR GATE
– TOP VIEW –


14
13
12
11
10
9
8
VDD (+2to+6V)
GND
1
2
3
4
5
6
7



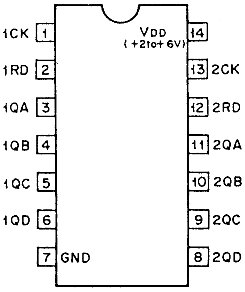
$Y=\overline{A+B}=\overline{A}\cdot\overline{B}$

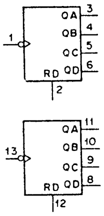
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

0: LOW LEVEL
1: HIGH LEVEL

SN74HC393N (TI)
TC74HC393P (TOSHIBA)

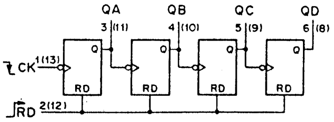
C-MOS 4-BIT BINARY COUNTER
– TOP VIEW –


1CK 1
1RD 2
1QA 3
1QB 4
1QC 5
1QD 6
7 GND
VDD (+2to+6V)
14
13 2CK
12 2RD
11 2QA
10 2QB
9 2QC
8 2QD


1
QA 3
QB 4
QC 5
RD QD 6
2
13
QA 11
QB 10
QC 9
RD QD 8
12

COUNT SEQUENCE

COUNT	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1


QA
QB
QC
QD
3 (11)
4 (10)
5 (9)
6 (8)
CK 1(13)
Q
RD
RD 2(12)

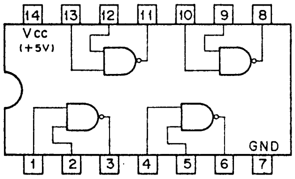
RESET/COUNT FUNCTION

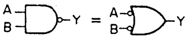
RD	QD	QC	QB	QA
1	0	0	0	0
0	COUNT			

0; LOW LEVEL
1; HIGH LEVEL

SN74LS00N (TI)
SN74S00N (TI)

TTL 2-INPUT POSITIVE-NAND GATE
– TOP VIEW –


14
13
12
11
10
9
8
Vcc (+5V)
GND
1
2
3
4
5
6
7



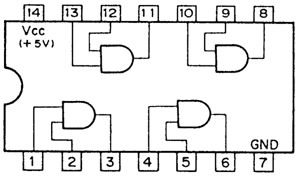
$Y=\overline{A\cdot B}=\overline{A}+\overline{B}$

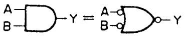
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0; LOW LEVEL
1; HIGH LEVEL

SN74LS08N (MOTOROLA)

TTL 2-INPUT POSITIVE-AND GATE
– TOP VIEW –


14
13
12
11
10
9
8
Vcc (+5V)
GND
1
2
3
4
5
6
7



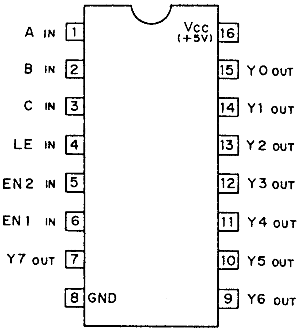
$Y=A\cdot B=\overline{\overline{A}+\overline{B}}$

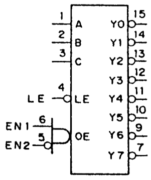
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

0; LOW LEVEL
1; HIGH LEVEL

SN74LS137N (TI)

TTL 3-TO-8-LINE DECODER/DEMULTIPLEXER WITH ADDRESS LATCH
– TOP VIEW –


A IN 1
B IN 2
C IN 3
LE IN 4
EN2 IN 5
EN1 IN 6
Y7 OUT 7
8 GND
Vcc (+5V) 16
15 Y0 OUT
14 Y1 OUT
13 Y2 OUT
12 Y3 OUT
11 Y4 OUT
10 Y5 OUT
9 Y6 OUT

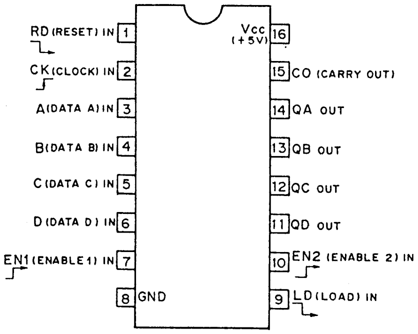

1 A
2 B
3 C
4 LE
EN1 6
EN2 5
OE
Y0 15
Y1 14
Y2 13
Y3 12
Y4 11
Y5 10
Y6 9
Y7 7

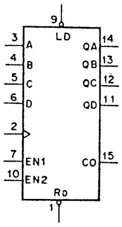
INPUTS						OUTPUTS							
LE	EN1	EN2	C	B	A	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0
×	×	1	×	×	×	1	1	1	1	1	1	1	1
×	0	×	×	×	×	1	1	1	1	1	1	1	1
0	1	0	0	0	0	1	1	1	1	1	1	1	0
0	1	0	0	0	1	1	1	1	1	1	1	0	1
0	1	0	0	1	0	1	1	1	1	1	0	1	1
0	1	0	0	1	1	1	1	1	1	0	1	1	1
0	1	0	1	0	0	1	1	1	0	1	1	1	1
0	1	0	1	0	1	1	1	0	1	1	1	1	1
0	1	0	1	1	0	1	0	1	1	1	1	1	1
0	1	0	1	1	1	0	1	1	1	1	1	1	1
1	1	0	×	×	×	NOT CHANGE							

0 : LOW LEVEL
1 : HIGH LEVEL
×: DON'T CARE

SN74LS161AN (TI)

TTL PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER
– TOP VIEW –


RD (RESET) IN 1
CK (CLOCK) IN 2
A (DATA A) IN 3
B (DATA B) IN 4
C (DATA C) IN 5
D (DATA D) IN 6
EN1 (ENABLE 1) IN 7
8 GND
Vcc (+5V) 16
15 CO (CARRY OUT)
14 QA OUT
13 QB OUT
12 QC OUT
11 QD OUT
10 EN2 (ENABLE 2) IN
9 LD (LOAD) IN

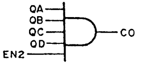

9
LD
3 A
4 B
5 C
6 D
2
7 EN1
10 EN2
RD
1
QA 14
QB 13
QC 12
QD 11
CO 15

MODE SELECTION

CONTROL INPUTS				MODE
RD	LD	EN1	EN2	
0	X	X	X	RESET (ASYNCHRONOUS)
1	0	X	X	PRESET (SYNCHRONOUS)
1	1	0	X	NO COUNT
1	1	X	0	NO COUNT
1	1	1	1	COUNT

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

CARRY OUTPUT "CO"


QA
QB
QC
QD
EN2
CO

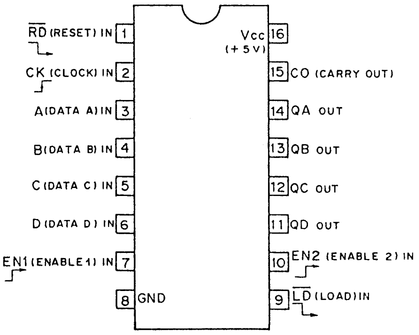
CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

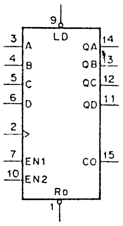
COUNT SEQUENCE

COUNT	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

SN74LS163AN (TI)
SN74S163N (TI)

TTL PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER
- TOP VIEW -


$\overline{RD}$ (RESET) IN 1
CK (CLOCK) IN 2
A (DATA A) IN 3
B (DATA B) IN 4
C (DATA C) IN 5
D (DATA D) IN 6
$\overline{EN1}$ (ENABLE 1) IN 7
8 GND
Vcc (+5V) 16
15 CO (CARRY OUT)
14 QA OUT
13 QB OUT
12 QC OUT
11 QD OUT
10 EN2 (ENABLE 2) IN
9 $\overline{LD}$ (LOAD) IN


9
LD
3 A
4 B
5 C
6 D
2
7 EN1
10 EN2
RD
1
QA 14
QB 13
QC 12
QD 11
CO 15

MODE SELECTION

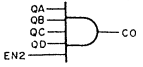
CONTROL INPUTS				MODE
$\overline{RD}$	$\overline{LD}$	EN1	EN2	
0	X	X	X	RESET (SYNCHRONOUS)
1	0	X	X	PRESET (SYNCHRONOUS)
1	1	0	X	NO COUNT
1	1	X	0	NO COUNT
1	1	1	1	COUNT

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

COUNT SEQUENCE

COUNT	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

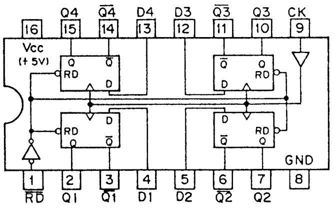
CARRY OUTPUT "CO"

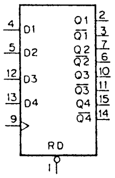

QA
QB
QC
QD
EN2
CO

CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

SN74LS175N (TI)

TTL D-TYPE FLIP-FLOP WITH CLEAR
- TOP VIEW -


Q4
$\overline{Q4}$
D4
D3
$\overline{Q3}$
Q3
CK
16
15
14
13
12
11
10
9
Vcc (+5V)
Q
$\overline{Q}$
RD
D
GND
1
2
3
4
5
6
7
8
$\overline{RD}$
Q1
$\overline{Q1}$
D1
D2
$\overline{Q2}$
Q2

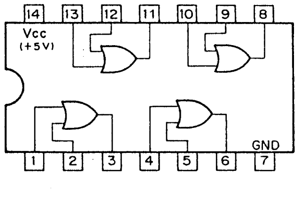

4 D1
5 D2
12 D3
13 D4
9
RD
1
Q1 2
$\overline{Q1}$ 3
Q2 7
$\overline{Q2}$ 6
Q3 10
$\overline{Q3}$ 11
Q4 15
$\overline{Q4}$ 14

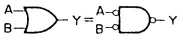
$\overline{RD}$	CK	D	Q	$\overline{Q}$
0	X	X	0	1
1	↑	1	1	0
1	↑	0	0	1
1	0	X	Qo	$\overline{Qo}$

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

SN74LS32N (TI)

TTL 2-INPUT POSITIVE-OR GATE
- TOP VIEW -


14
13
12
11
10
9
8
Vcc (+5V)
GND
1
2
3
4
5
6
7



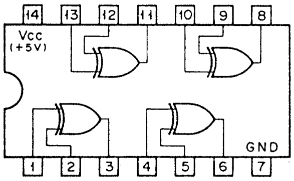
$Y = A + B = \overline{\overline{A} \cdot \overline{B}}$

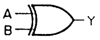
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

0; LOW LEVEL
1; HIGH LEVEL

SN74LS86AN (TI)

TTL EXCLUSIVE OR GATE
- TOP VIEW -


14
13
12
11
10
9
8
Vcc (+5V)
GND
1
2
3
4
5
6
7



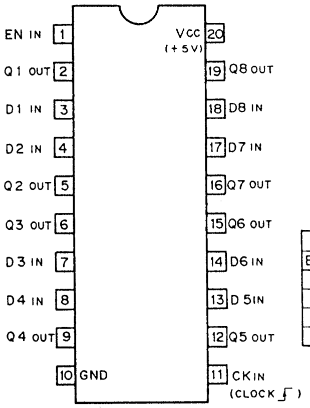
$Y = \overline{A} \cdot B + A \cdot \overline{B}$

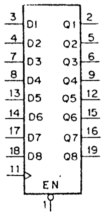
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

0; LOW LEVEL
1; HIGH LEVEL

SN74S374N (TI)

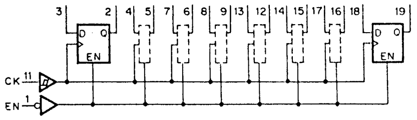
TTL 3-STATE OUTPUTS OCTAL D-TYPE FLIP-FLOP
- TOP VIEW -


EN IN 1
Q1 OUT 2
D1 IN 3
D2 IN 4
Q2 OUT 5
Q3 OUT 6
D3 IN 7
D4 IN 8
Q4 OUT 9
10 GND
Vcc (+5V) 20
19 Q8 OUT
18 D8 IN
17 D7 IN
16 Q7 OUT
15 Q6 OUT
14 D6 IN
13 D5 IN
12 Q5 OUT
11 CK IN (CLOCK ↑)


3 D1
4 D2
7 D3
8 D4
13 D5
14 D6
17 D7
18 D8
11
EN
1
Q1 2
Q2 5
Q3 6
Q4 9
Q5 12
Q6 15
Q7 16
Q8 19

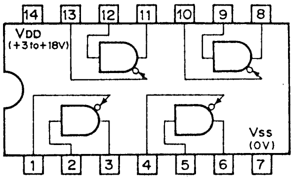
INPUTS			OUT
EN	D	CK	Q
0	1	↑	1
0	0	↑	0
0	X	0	Qo
1	X	X	HI-Z

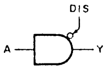
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE


3
2
4
5
7
6
8
9
13
12
14
15
17
16
18
19
D
Q
EN
CK 11
EN 1

TC5024BP (TOSHIBA)

C-MOS BUS BUFFER WITH 3-STATE OUTPUT
- TOP VIEW -


14
13
12
11
10
9
8
VDD (+3 to +18V)
Vss (0V)
1
2
3
4
5
6
7

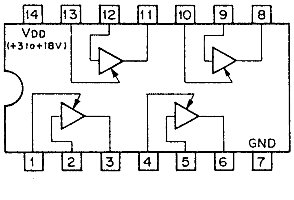


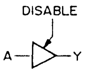
A	DIS	Y
0	0	0
1	0	1
0	1	HI-Z
1	1	HI-Z

0; LOW LEVEL
1; HIGH LEVEL
HI-Z; HIGH IMPEDANCE

TC5025BP (TOSHIBA)

C-MOS 3-STATE BUFFER
- TOP VIEW -


14
13
12
11
10
9
8
VDD (+3 to +18V)
GND
1
2
3
4
5
6
7

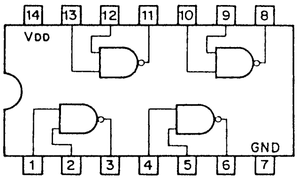


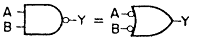
INPUTS		OUTPUTS
A	DIS	Y
0	0	Z
1	0	Z
0	1	0
1	1	1

0 = LOW LEVEL
1 = HIGH LEVEL
Z = HIGH IMPEDANCE

TC74HC00P (TOSHIBA) (V_{DD} = + 2 to + 6V)

C-MOS QUAD 2-INPUT NAND GATE
– TOP VIEW –


14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7



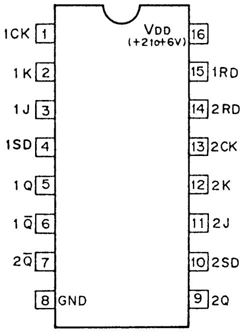
$Y = \overline{A \cdot B} = \overline{A} + \overline{B}$

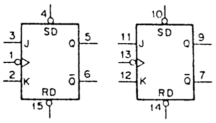
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0; LOW LEVEL
1; HIGH LEVEL

TC74HC112P (TOSHIBA)

C-MOS J-K FLIP-FLOP WITH DIRECT SET/RESET
– TOP VIEW –


1CK 1
1K 2
1J 3
1SD 4
1Q 5
1Q̄ 6
2Q̄ 7
8 GND
VDD (+2 to +6V) 16
15 1RD
14 2RD
13 2CK
12 2K
11 2J
10 2SD
9 2Q

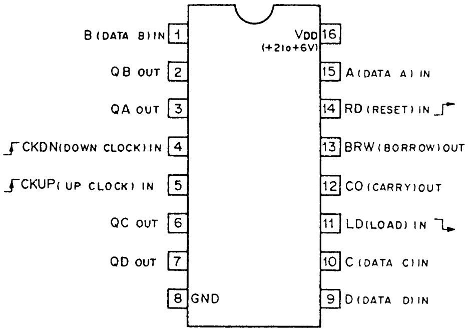

4
SD
3
J
1
2
K
Q
5
Q̄
6
RD
15
10
SD
11
J
13
12
K
Q
9
Q̄
7
RD
14

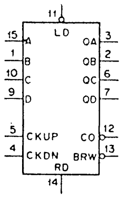
INPUT					OUTPUT	
SD	RD	CK	J	K	Qn+1	$\overline{\text{Qn+1}}$
0	1	X	X	X	1	0
1	0	X	X	X	0	1
0	0	X	X	X	1*	1*
1	1	⎤⎿	0	0	Qn	$\overline{\text{Qn}}$
			0	1	0	1
			1	0	1	0
			1	1	$\overline{\text{Qn}}$	Qn
1	1	1	X	X	Qn	$\overline{\text{Qn}}$

0; LOW LEVEL X; DON'T CARE
1; HIGH LEVEL ∗; NONSTABLE

TC74HC193P (TOSHIBA)

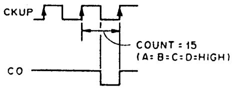
C-MOS PRESETTABLE SYNCHRONOUS 4-BIT UP/DOWN COUNTER
– TOP VIEW –


B (DATA B) IN 1
QB OUT 2
QA OUT 3
CKDN (DOWN CLOCK) IN 4
CKUP (UP CLOCK) IN 5
QC OUT 6
QD OUT 7
8 GND
VDD (+2 to +6V) 16
15 A (DATA A) IN
14 RD (RESET) IN
13 BRW (BORROW) OUT
12 CO (CARRY) OUT
11 LD (LOAD) IN
10 C (DATA C) IN
9 D (DATA D) IN

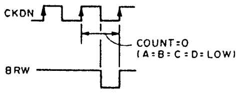

11
LD
15
A
1
B
10
C
9
D
5
CKUP
4
CKDN
RD
14
QA
3
QB
2
QC
6
QD
7
CO
12
BRW
13

CONTROL INPUT				MODE
RD	LD	CKUP	CKDN	
1	X	X	X	RESET TO ZERO
0	0	X	X	PRESET
0	1	⌐↑	1	UP COUNT
0	1	1	⌐↑	DOWN COUNT
0	1	1	1	NO COUNT

$CO = \overline{\overline{CKUP} \cdot QA \cdot QB \cdot QC \cdot QD}$


CKUP
COUNT = 15
(A = B = C = D = HIGH)
CO

$BRW = \overline{\overline{CKDN} \cdot \overline{QA} \cdot \overline{QB} \cdot \overline{QC} \cdot \overline{QD}}$


CKDN
COUNT = 0
(A = B = C = D = LOW)
BRW

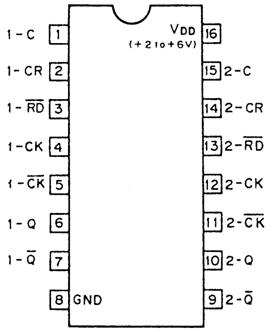
COUNT	OUTPUT			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

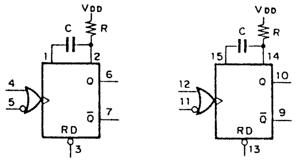
UP COUNT ↓
DOWN COUNT ↑

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

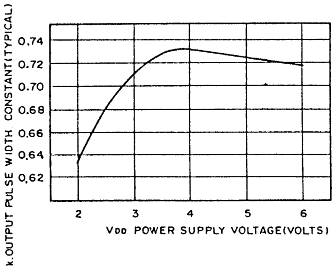
TC74HC4538P (TOSHIBA)

C-MOS DUAL RETRIGGERABLE/NON-RETRIGGERABLE MONOSTABLE MULTIVIBRATOR
– TOP VIEW –

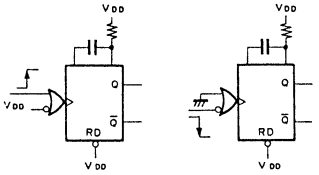

1-C 1
1-CR 2
1-RD̄ 3
1-CK 4
1-CK̄ 5
1-Q 6
1-Q̄ 7
8 GND
VDD (+2 to +6V) 16
15 2-C
14 2-CR
13 2-RD̄
12 2-CK
11 2-CK̄
10 2-Q
9 2-Q̄


VDD
C
R
1
2
4
5
Q
6
Q̄
7
RD
3
VDD
C
R
15
14
12
11
Q
10
Q̄
9
RD
13

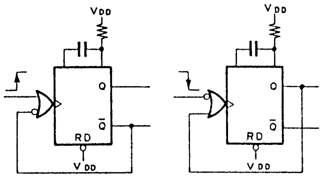
OUTPUT PULSE WIDTH = k·C·R



RETRIGGERABLE M.M.V

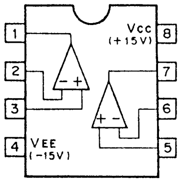

VDD
VDD
Q
Q̄
RD
VDD
VDD
Q
Q̄
RD
VDD

NON-RETRIGGERABLE M.M.V


VDD
Q
Q̄
RD
VDD
VDD
Q
Q̄
RD
VDD

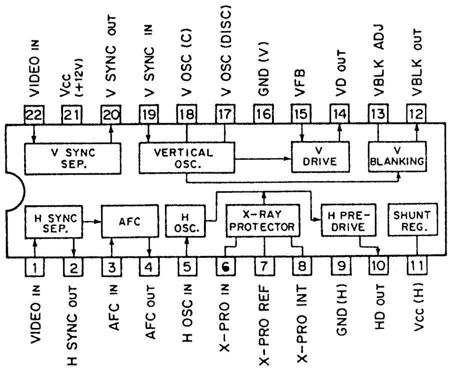
TL082CP (TI)

OPERATIONAL AMPLIFIER
(J FET-INPUT)
– TOP VIEW –


1
2
3
4 VEE (–15V)
Vcc (+15V) 8
7
6
5
–
+
+
–

uPC1377C (NEC)

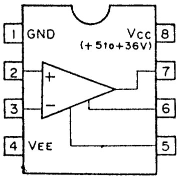
SYNCHRONIZATION SIGNAL PROCESSOR OF COLOR TV
- TOP VIEW -


VIDEO IN
Vcc (+12V)
V SYNC OUT
V SYNC IN
V OSC (C)
V OSC (DISC)
GND (V)
VFB
VD OUT
VBLK ADJ
VBLK OUT
22
21
20
19
18
17
16
15
14
13
12
V SYNC SEP.
VERTICAL OSC.
V DRIVE
V BLANKING
H SYNC SEP.
AFC
H OSC.
X-RAY PROTECTOR
H PRE-DRIVE
SHUNT REG.
1
2
3
4
5
6
7
8
9
10
11
VIDEO IN
H SYNC OUT
AFC IN
AFC OUT
H OSC IN
X-PRO IN
X-PRO REF
X-PRO INT
GND (H)
HD OUT
Vcc (H)

AFC IN	; INPUT OF AFC DETECTOR
AFC OUT	; OUTPUT OF AFC DETECTOR
GND(H)	; GROUND OF HORIZONTAL PART
GND(V)	; GROUND OF VERTICAL PART
HD OUT	; OUTPUT OF HORIZONTAL PULSE
HOSC IN	; INPUT OF HORIZONTAL OSCILLATION
HSYNC OUT	; OUTPUT OF SYNCRONIZATION SIGNAL SEPARATOR
VBLK OUT	; OUTPUT OF VERTICAL BLANKING PULSE
VBLKADJ	; VERTICAL BLANKING PULSE DURATION ADJUST
VCC	; VCC OF VERTICAL PART
VCC(H)	; VCC OF HORIZONTAL PART
VD OUT	; OUTPUT OF VERTICAL AMPLIFIER
VFB	; VERTICAL FEEDBACK
VIDEO IN	; INPUT OF HORIZONTAL/VERTICAL SYNCRONIZATION SIGNAL SEPARATOR
VOSC(C)	; VERTICAL OSCILLATION (CHARGE)
VOSC(DISC)	; VERTICAL OSCILLATION (DISCHARGE)
VSYNC IN	; INPUT OF VERTICAL SYNCRONIZATION SIGNAL
VSYNC OUT	; OUTPUT OF VERTICAL SYNCRONIZATION SIGNAL SEPARATOR
X-PRO IN	; INPUT OF X-RAY PROTECTOR
X-PRO INT	; INTEGRATION CIRCUIT OF X-RAY PROTECTOR
X-PRO REF	; REFERENCE OF X-RAY PROTECTOR

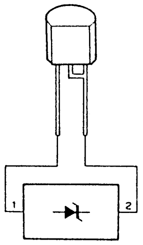
uPC311C (NEC)

VOLTAGE COMPARATOR
- TOP VIEW -


1
2
3
4
GND
Vcc
(+5to+36V)
+
−
VEE
8
7
6
5

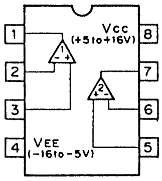
uPC574J (NEC)

BIPOLAR ZENER DIODE (10mA)
- FRONT VIEW -



uPC814C (NEC)

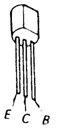
TTL-DUAL OPERATIONAL AMPLIFIER
- TOP VIEW -


1
2
3
4
Vcc
(+5to+16V)
1
2
VEE
(−16to−5V)
8
7
6
5

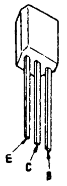
PAL20RA10 (MMI) (ACCESS TIME = 30nS)

C-MOS PROGRAMMABLE LOGIC DEVICE
- TOP VIEW -

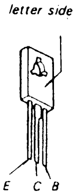
2SA1005
2SC1890A
2SC2362K
2SC2551
2SC2878
2SC3623A



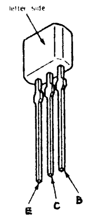
2SA1048
2SC403SP
DTA124ES
DTC114ES
DTC124ES



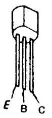
2SA1156
2SA1380
2SA1407
2SC2688
2SC2752
2SC3502
2SC3595
2SC3601


letter side
E
C
B

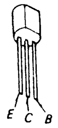
2SA1175
2SC2785


letter side
E
C
B

2SA1206



2SA1208
2SA1282
2SA893A
2SB739
2SB740
2SC2910
2SD669A
2SD788
2SD789



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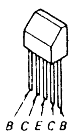

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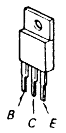

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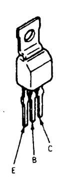

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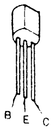

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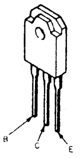

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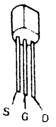

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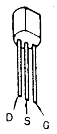
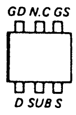
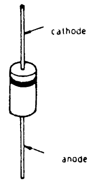


TX429M


GD N.C GS
D SUB S

1S1585
1S2076A
1SS83
ERC38-06
ERD28-08S
RD10EB2
RD10EL2
RD11EB2
RD13EB3
RD15EB2
RD3.9EB1
RD4.7EB2
RD5.1EB2
RD5.6EB1
RD5.6EB2
RD6.2EB1
RD6.2EL2
RD9.1EB1
RD9.1EB2


cathode
anode

1SS119
RD10ESB2
RD11ESB
RD11ESB2
RD13ESB2
RD15ESB2
RD3.9ESB2
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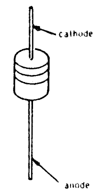
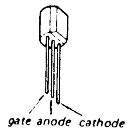
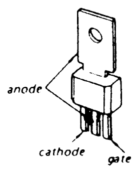
RD8.2ESB2
RD9.1ESB2


cathode
anode

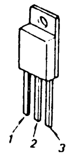
CR02AM-4
CR02AM-8


gate
anode
cathode

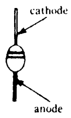
CR3CM-8


anode
cathode
gate

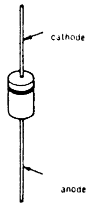
CTL-12S
CTL-22S



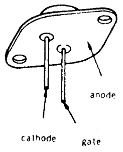
ERC06-15SA
V19C
V19CSS
V19E
V19EF1
V19GF1


cathode
anode

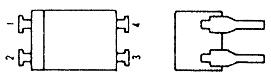
ERD31-04
HZT33-02
RH-1
RH-1A

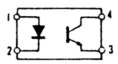

cathode
anode

SG264A

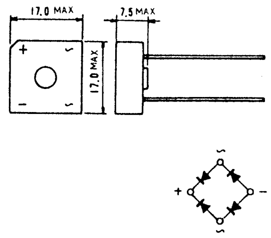

anode
cathode
gate

PC817

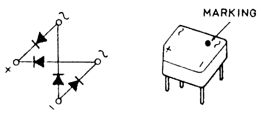




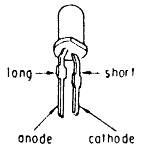
RB406N


17.0 MAX
7.5 MAX
17.0 MAX
+
−
+
−

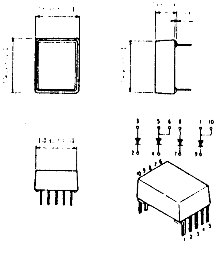
S3WB60Z



GL-3HY8
TLG124A
TLY124


long
short
anode
cathode

LT-9220H



SECTION 6

EXPLODED VIEWS

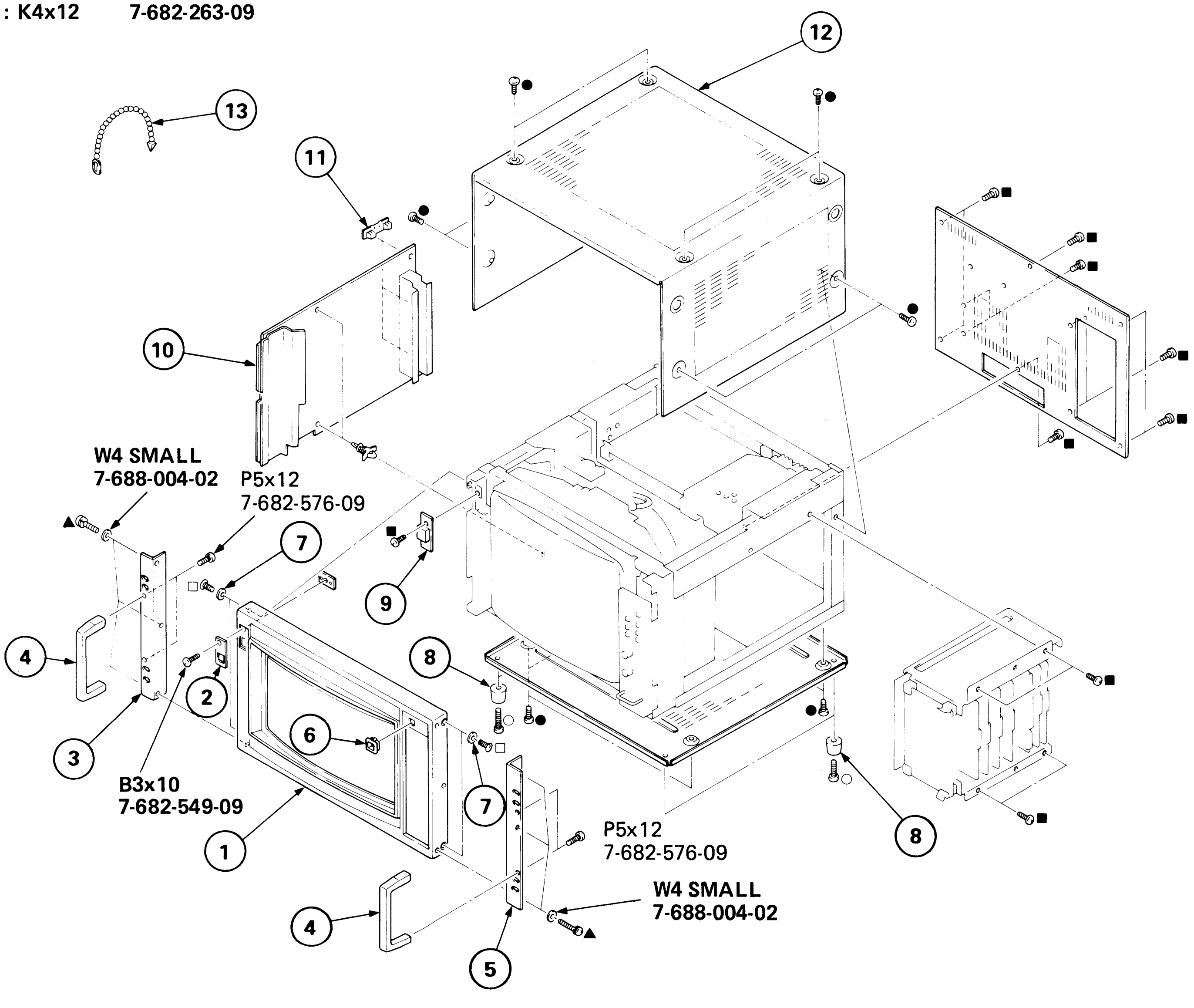
NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

6-1. BEZEL

●	B4x8	7-682-561-09
■	BVTP3x8	7-685-646-79
▲	PS4x16	7-682-665-09
○	PS4x14	7-682-664-09
□	K4x12	7-682-263-09



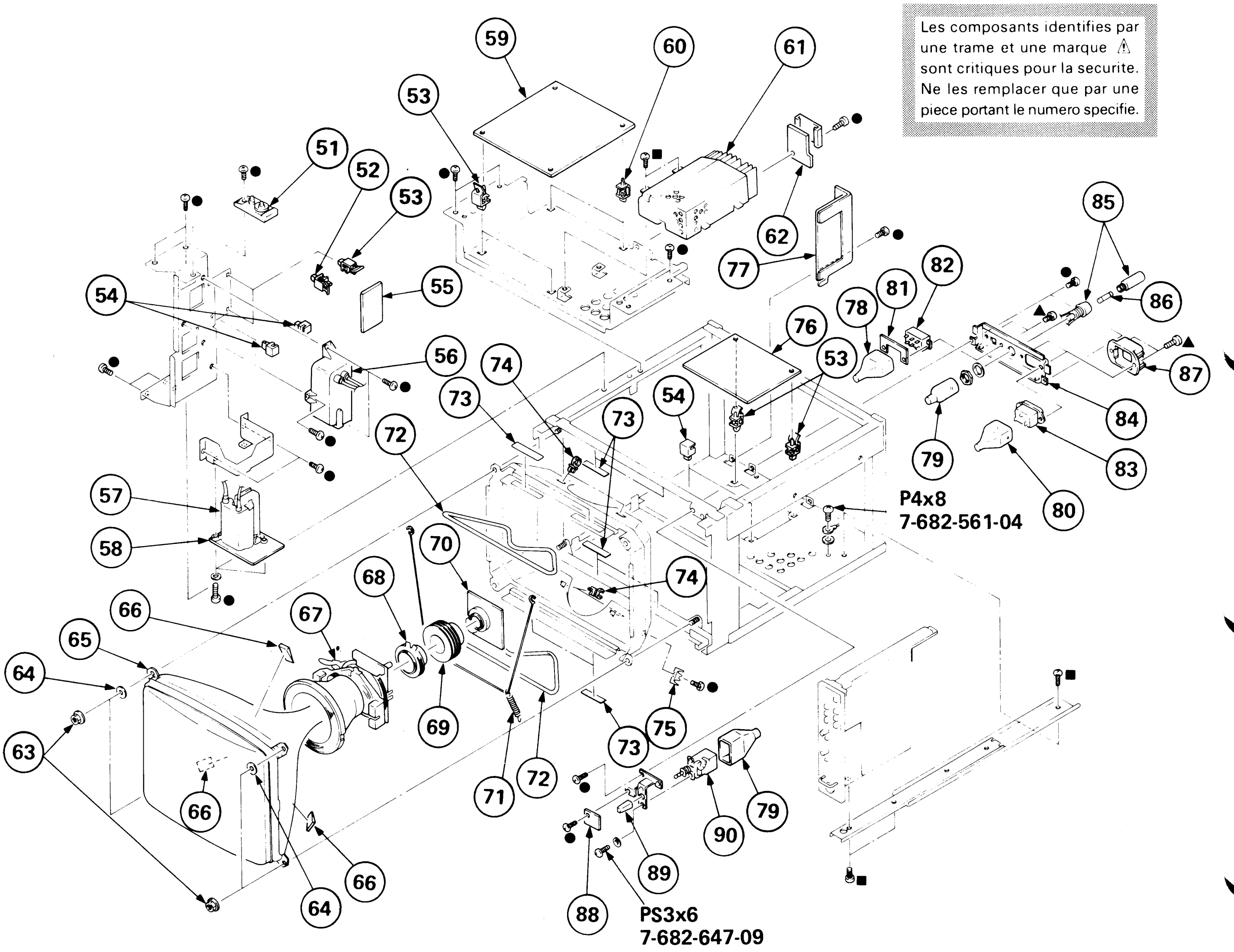
REF.NO.	PART NO.	DESCRIPTION	REMARK
1	X-4378-957-1	BEZEL ASSY	2,6
2	4-353-615-11	COVER	
3	*4-335-964-11	BASE (LEFT), HANDLE	
4	*4-337-212-11	HANDLE	
5	*4-335-963-11	BASE (RIGHT), HANDLE	
6	4-379-423-11	ESCUTCHEON (A)	
7	*4-309-378-00	SPACER	
8	X-4838-902-9	FOOT, RUBBER	
9	*1-617-474-11	L BOARD	
10	*A-1345-913-A	E BOARD, COMPLETE	
11	*4-313-732-00	CLIP, HINGE, CIRCUIT BOARD	
12	*4-353-644-31	COVER (UPPER)	
13	4-308-870-00	CLIP, LEAD WIRE	

6-2. CHASSIS

● : BVTP3x8 7-685-646-79
■ : BVTP4x8 7-685-659-79
▲ : P3x8 7-682-548-09

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

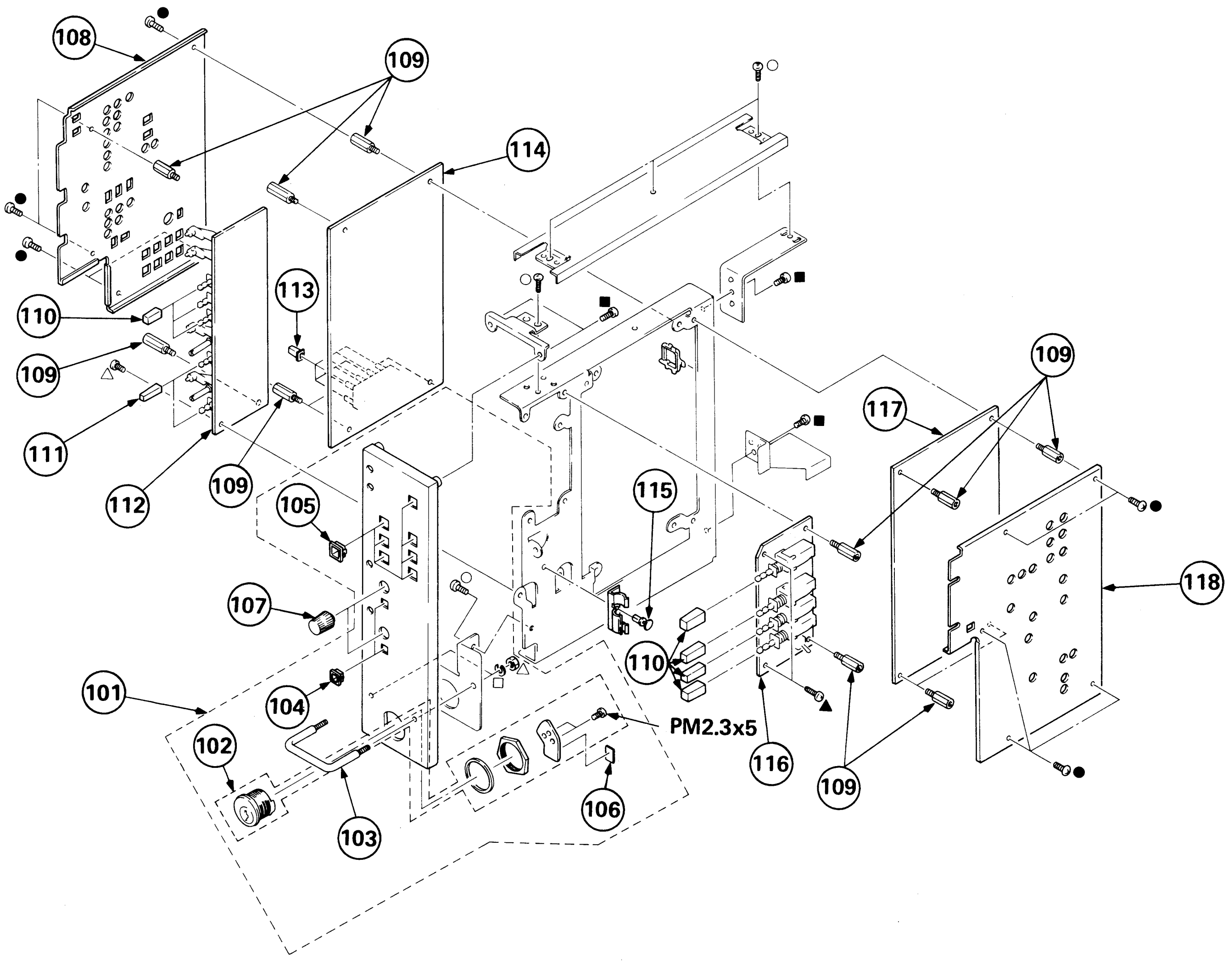
Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.



REF.NO.	PART NO.	DESCRIPTION	REMARK
51	⚠1-230-618-11	RESISTOR ASSY, HIGH-VOLTAGE	
52	*3-703-141-00	HOLDER, PCB	
53	*4-321-929-00	HOLDER, PC BOARD	
54	*3-701-903-00	HOLDER, PC BOARD	
55	*1-610-380-12	K BOARD	
56	⚠1-453-102-21	HIGH-VOLTAGE BLOCK (HB-202A)	
57	⚠1-439-381-21	TRANSFORMER ASSY, FLYBACK	
58	*1-617-480-11	P BOARD	
59	*A-1296-687-A	CA BOARD, COMPLETE	
60	*4-353-620-02	HINGE, PC BOARD	
61	⚠1-413-289-11	REGULATOR, SWITCHING (TK-15)	
62	*1-633-260-11	FA BOARD	
63	4-306-034-00	FLANGE NUT,(B) 5MM	
64	4-026-534-00	WASHER, POSITION	
65	⚠8-738-051-05	PICTURE TUBE (M34JNR20X)	
66	3-703-961-01	SPACER, DY	
67	⚠1-451-285-11	DEFLECTION YOKE (Y14FAC)	
68	⚠1-452-261-12	PICTURE TUBE NECK ASSY (362)	
69	⚠1-452-117-31	PICTURE TUBE NECK ASSY	
70	*1-617-465-11	CB BOARD	
71	4-303-774-99	SPRING	
72	⚠1-426-263-11	COIL, DEMAGNETIZATION	
73	*9-911-837-99	CUSHION	
74	*4-322-922-00	HOLDER, COIL, DEGAUSSER	
75	*4-309-624-00	TERMINAL, EARTH	
76	*A-1240-658-A	F BOARD, COMPLETE	
77	*1-617-469-11	G BOARD	
78	*4-371-879-02	COVER, AC SELECT	
79	*4-393-031-01	COVER, FUSE HOLDER	
80	4-601-466-11	COVER, 3P INLET	
81	*4-379-409-01	NUT, PLATE	
82	⚠1-570-173-22	SWITCH, VOLTAGE CHANGE	
83	⚠1-560-222-11	INLET 3P	
84	*4-378-920-01	PANEL, CONNECTOR	
85	1-533-224-11	HOLDER, FUSE (DIA. 5.2)	
86	⚠1-532-350-11	FUSE, GLASS TUBE 4A/250V(HDM-1230E ONLY)	
	⚠1-532-746-11	FUSE, GLASS TUBE 4A/125V (HDM-1230 ONLY)	
87	*2-990-241-01	HOLDER (A), PLUG	
88	*1-617-475-11	Y BOARD	
89	4-378-925-11	BUTTON (A)	
90	⚠1-571-877-11	SWITCH, PUSH (AC POWER)	

6-3. DRAWER BLOCK

●	P3x8	7-682-548-09
■	BVTP3x8	7-685-646-79
▲	P3x6	7-682-547-09
○	BVTP3x6	7-685-645-79
□	SW3	7-623-208-22
△	N3	7-684-023-04


108
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102
103
106
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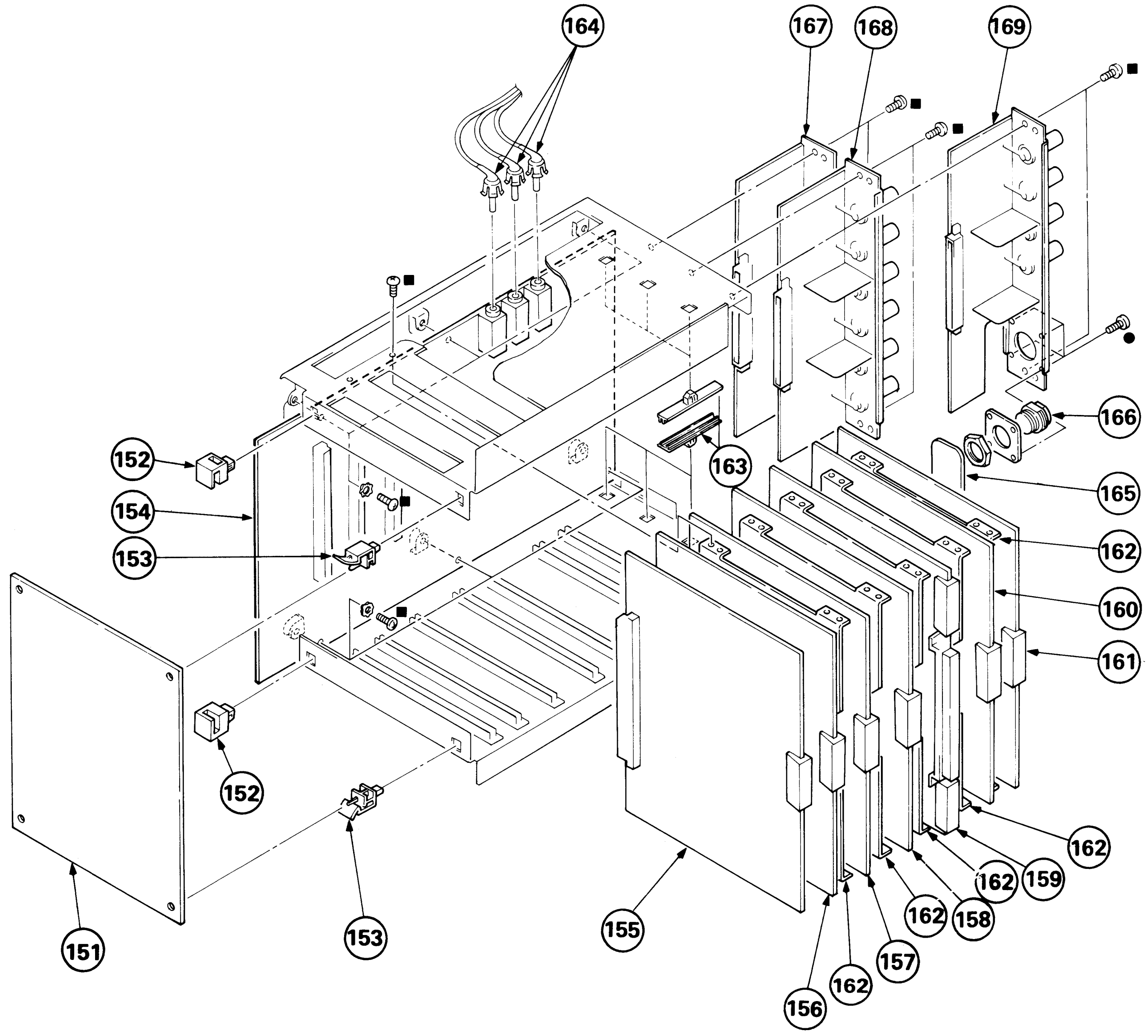
116
109
PM2.3x5

REF.NO.	PART NO.	DESCRIPTION	REMARK
101	X-4378-956-1	PANEL ASSY, CONTROL	102-106
102	4-378-917-01	LOCK, CYLINDER	
103	4-335-904-02	HANDLE (S)	
104	4-379-424-11	ESCUTCHEON (B)	
105	4-379-423-11	ESCUTCHEON (A)	
106	*3-657-066-01	SHOE, (S) BRAKE	
107	4-378-916-01	KNOB, VOL	
108	*4-393-078-01	COVER, I PC BOARD	
109	*2-286-702-01	SUPPORT	
110	4-374-839-01	BUTTON (A)	
111	4-378-903-11	BUTTON (B)	
112	*1-617-472-11	JA BOARD	
113	4-369-627-01	PUSH BUTTON	
114	*A-1375-086-A	I BOARD, COMPLETE	
115	3-531-576-01	RIVET	
116	*1-617-473-11	JB BOARD	
117	*A-1345-914-A	DA BOARD, COMPLETE	
118	*4-393-077-01	COVER, DA PC BOARD	

6-4. SIGNAL BLOCK

● : P3x6 7-682-547-09
■ : BVTP3x8 7-685-646-79


164
167
168
169
■
■
■
■
●
166
152
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■
■
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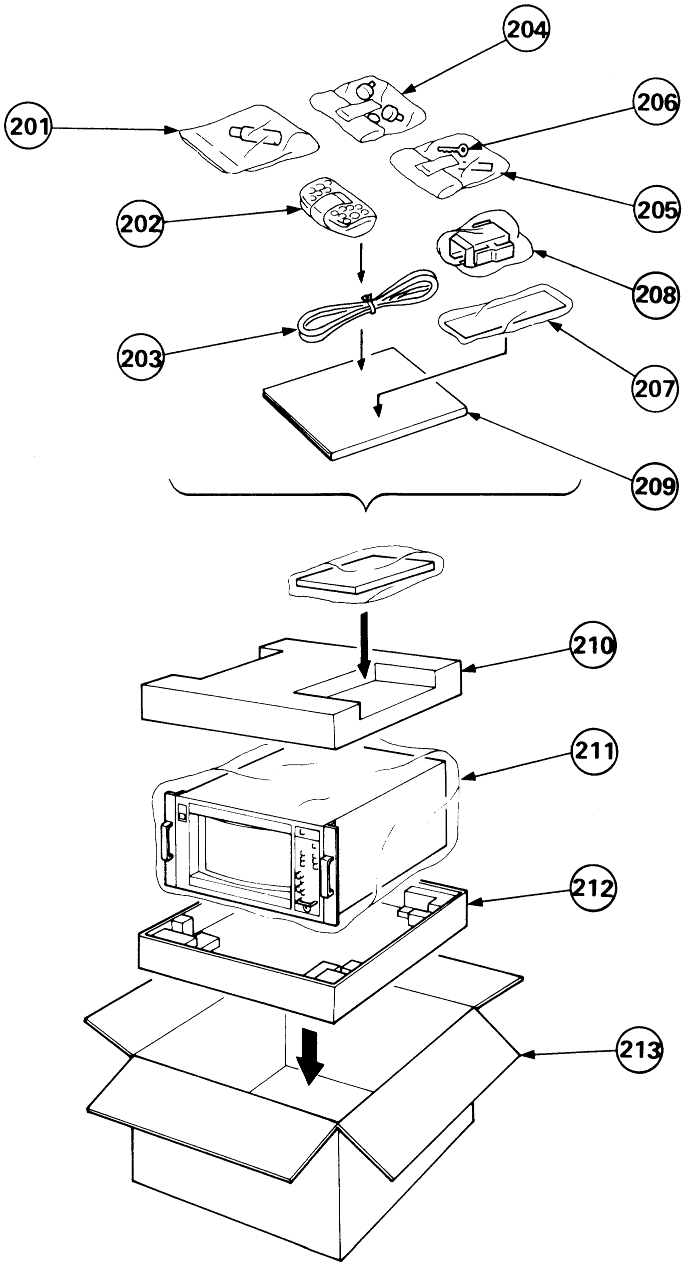
156

REF.NO.	PART NO.	DESCRIPTION	REMARK
151	*A-1345-912-A	DB BOARD, COMPLETE	
152	*3-701-903-00	HOLDER, PC BOARD	
153	*3-703-141-00	HOLDER, PCB	
154	*1-633-259-11	BN BOARD	
155	*A-1296-453-A	BG BOARD, COMPLETE	
156	*A-1296-452-A	BF BOARD, COMPLETE	
157	*A-1296-451-A	BE BOARD, COMPLETE	
158	*A-1296-079-A	BD BOARD, COMPLETE	
159	*A-1389-709-A	XA BOARD, COMPLETE	
160	*A-1296-450-A	BB BOARD, COMPLETE	
161	*A-1135-524-A	BA BOARD, COMPLETE	
162	*4-378-928-01	PLATE, SHIELD	
163	*3-680-613-11	SUPPORT, PC BOARD	
164	*1-555-110-00	CABLE, PIN	
165	*1-617-479-11	QD BOARD	
166	1-536-992-11	INTERNAL BOARD, INPUT/OUTPUT	
167	*A-1275-090-A	QB BOARD, COMPLETE	
168	*A-1275-089-A	QA BOARD, COMPLETE	
169	*A-1275-069-A	QC BOARD, COMPLETE	165,166

6-5. PACKING



The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
201	1-560-776-00	SOCKET, CONNECTOR 10P		208	*2-990-242-01	HOLDER (B), PLUG	
202	⚠1-532-350-11	FUSE, GLASS TUBE 4A/250V(HDM-1230E ONLY)		209	4-393-088-02	MANUAL,OPERATION & MAINTENANCE	
	⚠1-532-746-11	FUSE, GLASS TUBE 4A/125V (HDM-1230 ONLY)		210	*4-378-956-01	CUSHION (UPPER)	
203	⚠1-534-819-14	CORD, POWER (HDM-1230E ONLY)		211	*4-377-015-01	BAG, PROTECTION	
	⚠1-551-812-11	CORD, POWER (HDM-1230 ONLY)		212	*4-378-957-01	CUSHION (LOWER)	
204	1-564-662-11	PLUG, BNC (75 OHM)		213	*4-393-083-01	INDIVIDUAL CARTON	
205	7-700-731-03	DRIVER, VR ADJUSTMENT					
206	4-378-901-01	KEY					
207	4-353-603-00	PLATE, NUMBER					

SECTION 7
ELECTRICAL PARTS LIST

BA

NOTE:

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS
- All resistors are in ohms
- F : nonflammable

When indicating parts by reference number, please include the board name.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

- The components identified by ⧓ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF.NO.	PART NO.	DESCRIPTION			REMARK
	*A-1135-524-A	BA BOARD, COMPLETE ******************			
	*4-353-708-00	HOOK, FINGER			
		<CONNECTOR>			
BA1	*1-562-729-11	CONNECTOR, MULTI 64P			
	4-378-915-01	NUT (M2.6), PLATE; BA1			
BA2	*1-562-454-11	CONNECTOR 15P			
BA3	*1-562-454-11	CONNECTOR 15P			
BA4	*1-562-455-11	CONNECTOR 22P			
		<CAPACITOR>			
C101	1-126-233-11	ELECT	22MF	20%	25V
C102	1-101-004-00	CERAMIC	0.01MF		50V
C103	1-101-004-00	CERAMIC	0.01MF		50V
C104	1-126-233-11	ELECT	22MF	20%	25V
C105	1-101-004-00	CERAMIC	0.01MF		50V
C106	1-126-233-11	ELECT	22MF	20%	25V
C107	1-101-004-00	CERAMIC	0.01MF		50V
C108	1-101-004-00	CERAMIC	0.01MF		50V
C109	1-126-233-11	ELECT	22MF	20%	25V
C110	1-126-233-11	ELECT	22MF	20%	25V
C111	1-101-004-00	CERAMIC	0.01MF		50V
C114	1-101-004-00	CERAMIC	0.01MF		50V
C115	1-126-233-11	ELECT	22MF	20%	25V
C116	1-101-004-00	CERAMIC	0.01MF		50V
C117	1-101-004-00	CERAMIC	0.01MF		50V
C120	1-101-004-00	CERAMIC	0.01MF		50V
C121	1-126-233-11	ELECT	22MF	20%	25V
C122	1-126-233-11	ELECT	22MF	20%	25V
C123	1-101-004-00	CERAMIC	0.01MF		50V
C124	1-101-004-00	CERAMIC	0.01MF		50V
C125	1-126-233-11	ELECT	22MF	20%	25V
C126	1-101-004-00	CERAMIC	0.01MF		50V
C128	1-126-233-11	ELECT	22MF	20%	25V
C201	1-124-282-00	ELECT	22MF	20%	16V
C203	1-124-631-11	ELECT	47MF	20%	16V
C205	1-126-233-11	ELECT	22MF	20%	25V
C207	1-126-233-11	ELECT	22MF	20%	25V
C208	1-126-233-11	ELECT	22MF	20%	25V
C209	1-126-233-11	ELECT	22MF	20%	25V
C210	1-126-233-11	ELECT	22MF	20%	25V
C211	1-126-233-11	ELECT	22MF	20%	25V
C212	1-101-004-00	CERAMIC	0.01MF		50V
C213	1-101-004-00	CERAMIC	0.01MF		50V
C214	1-126-233-11	ELECT	22MF	20%	25V
C215	1-101-004-00	CERAMIC	0.01MF		50V
C217	1-126-233-11	ELECT	22MF	20%	25V
C219	1-126-233-11	ELECT	22MF	20%	25V
C220	1-126-233-11	ELECT	22MF	20%	25V
C221	1-101-004-00	CERAMIC	0.01MF		50V
C222	1-101-004-00	CERAMIC	0.01MF		50V
C223	1-126-233-11	ELECT	22MF	20%	25V
C224	1-124-631-11	ELECT	47MF	20%	16V
C301	1-101-004-00	CERAMIC	0.01MF		50V
C302	1-126-233-11	ELECT	22MF	20%	25V
C303	1-101-004-00	CERAMIC	0.01MF		50V
C304	1-126-233-11	ELECT	22MF	20%	25V
C305	1-124-791-11	ELECT	1MF	20%	50V
C306	1-126-233-11	ELECT	22MF	20%	25V
C307	1-126-233-11	ELECT	22MF	20%	25V
C308	1-101-004-00	CERAMIC	0.01MF		50V
C309	1-101-004-00	CERAMIC	0.01MF		50V
C310	1-126-101-11	ELECT	100MF	20%	16V
C311	1-126-101-11	ELECT	100MF	20%	16V
C312	1-126-233-11	ELECT	22MF	20%	25V
C313	1-126-233-11	ELECT	22MF	20%	25V
C314	1-101-004-00	CERAMIC	0.01MF		50V
C315	1-101-004-00	CERAMIC	0.01MF		50V
C316	1-124-120-11	ELECT	220MF	20%	25V
C317	1-124-120-11	ELECT	220MF	20%	25V
C318	1-124-477-11	ELECT	47MF	20%	25V
C319	1-124-477-11	ELECT	47MF	20%	25V
C320	1-101-004-00	CERAMIC	0.01MF		50V
C321	1-126-233-11	ELECT	22MF	20%	25V
C322	1-101-004-00	CERAMIC	0.01MF		50V
C323	1-126-233-11	ELECT	22MF	20%	25V
C324	1-124-791-11	ELECT	1MF	20%	50V
C325	1-126-233-11	ELECT	22MF	20%	25V
C326	1-126-233-11	ELECT	22MF	20%	25V
C327	1-101-004-00	CERAMIC	0.01MF		50V
C328	1-126-233-11	ELECT	22MF	20%	25V
C329	1-101-004-00	CERAMIC	0.01MF		50V
C330	1-126-233-11	ELECT	22MF	20%	25V
C331	1-124-791-11	ELECT	1MF	20%	50V
C332	1-126-233-11	ELECT	22MF	20%	25V
C333	1-126-233-11	ELECT	22MF	20%	25V
C334	1-124-791-11	ELECT	1MF	20%	50V
C335	1-124-791-11	ELECT	1MF	20%	50V
C336	1-124-791-11	ELECT	1MF	20%	50V
C337	1-124-791-11	ELECT	1MF	20%	50V
C338	1-124-791-11	ELECT	1MF	20%	50V
C339	1-124-791-11	ELECT	1MF	20%	50V
C340	1-101-004-00	CERAMIC	0.01MF		50V
		<DIODE>			
D101	8-719-110-41	DIODE RD15ES-B2			
D200	8-719-110-36	DIODE RD13ES-B2			
D201	8-719-911-19	DIODE 1SS119			

BA

REF.NO.	PART NO.	DESCRIPTION	REMARK
D203	8-719-911-19	DIODE 1SS119	
D205	8-719-110-41	DIODE RD15ES-B2	
D207	8-719-911-19	DIODE 1SS119	
D208	8-719-911-19	DIODE 1SS119	
D209	8-719-911-19	DIODE 1SS119	
D210	8-719-911-19	DIODE 1SS119	
D211	8-719-911-19	DIODE 1SS119	
D212	8-719-911-19	DIODE 1SS119	
D213	8-719-911-19	DIODE 1SS119	
D214	8-719-911-19	DIODE 1SS119	
D215	8-719-911-19	DIODE 1SS119	
D216	8-719-911-19	DIODE 1SS119	
D301	8-719-901-95	DIODE V19CSS	
D302	8-719-901-95	DIODE V19CSS	
D305	8-719-911-19	DIODE 1SS119	
D306	8-719-911-19	DIODE 1SS119	
D307	8-719-911-19	DIODE 1SS119	
D308	8-719-911-19	DIODE 1SS119	
		<IC>	
IC101	8-759-800-81	IC LA7016	
IC102	8-759-800-81	IC LA7016	
IC103	8-759-800-81	IC LA7016	
IC202	8-759-800-81	IC LA7016	
IC203	8-759-250-24	IC TC5024BP	
IC204	8-759-250-25	IC TC5025BP	
IC301	8-759-400-29	IC AN78L04	
IC303	8-759-982-46	IC RC79L08A	
IC305	8-759-602-66	IC M5230L-A	
IC306	8-759-602-66	IC M5230L-A	
IC307	8-759-602-66	IC M5230L-A	
		<TRANSISTOR>	
Q101	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q102	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q103	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q200	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q201	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q202	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q203	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q204	8-729-378-84	TRANSISTOR 2SD788-5	
Q301	8-729-378-84	TRANSISTOR 2SD788-5	
Q302	8-729-600-82	TRANSISTOR 2SA1282-F	
Q303	8-729-378-84	TRANSISTOR 2SD788-5	
Q304	8-729-600-82	TRANSISTOR 2SA1282-F	
Q305	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q306	8-729-378-84	TRANSISTOR 2SD788-5	
Q307	8-729-600-82	TRANSISTOR 2SA1282-F	
		<RESISTOR>	
R100	1-249-405-11	CARBON 100 5% 1/4W	
R101	1-249-437-11	CARBON 47K 5% 1/4W	
R102	1-249-437-11	CARBON 47K 5% 1/4W	
R103	1-249-437-11	CARBON 47K 5% 1/4W	
R104	1-249-405-11	CARBON 100 5% 1/4W	
R105	1-249-405-11	CARBON 100 5% 1/4W	
R106	1-249-405-11	CARBON 100 5% 1/4W	
R107	1-249-405-11	CARBON 100 5% 1/4W	
R108	1-249-421-11	CARBON 2.2K 5% 1/4W	
R109	1-215-393-00	METAL 68 1% 1/6W	
R110	1-249-405-11	CARBON 100 5% 1/4W	

REF.NO.	PART NO.	DESCRIPTION	REMARK
R111	1-249-405-11	CARBON 100 5% 1/4W	
R112	1-249-405-11	CARBON 100 5% 1/4W	
R113	1-249-405-11	CARBON 100 5% 1/4W	
R114	1-249-405-11	CARBON 100 5% 1/4W	
R115	1-249-421-11	CARBON 2.2K 5% 1/4W	
R116	1-249-405-11	CARBON 100 5% 1/4W	
R117	1-249-405-11	CARBON 100 5% 1/4W	
R118	1-215-393-00	METAL 68 1% 1/6W	
R119	1-249-437-11	CARBON 47K 5% 1/4W	
R120	1-249-437-11	CARBON 47K 5% 1/4W	
R121	1-249-437-11	CARBON 47K 5% 1/4W	
R122	1-249-405-11	CARBON 100 5% 1/4W	
R123	1-249-405-11	CARBON 100 5% 1/4W	
R124	1-249-435-11	CARBON 33K 5% 1/4W	
R125	1-249-405-11	CARBON 100 5% 1/4W	
R126	1-249-427-11	CARBON 6.8K 5% 1/4W	
R127	1-249-405-11	CARBON 100 5% 1/4W	
R128	1-249-421-11	CARBON 2.2K 5% 1/4W	
R129	1-215-393-00	METAL 68 1% 1/6W	
R130	1-249-405-11	CARBON 100 5% 1/4W	
R201	1-249-437-11	CARBON 47K 5% 1/4W	
R203	1-249-465-11	CARBON 47K 5% 1/4W	
R205	1-249-465-11	CARBON 47K 5% 1/4W	
R207	1-247-901-11	CARBON 820K 5% 1/4W	
R209	1-247-901-11	CARBON 820K 5% 1/4W	
R211	1-249-405-11	CARBON 100 5% 1/4W	
R213	1-249-405-11	CARBON 100 5% 1/4W	
R215	1-249-405-11	CARBON 100 5% 1/4W	
R219	1-249-405-11	CARBON 100 5% 1/4W	
R220	1-249-405-11	CARBON 100 5% 1/4W	
R222	1-249-421-11	CARBON 2.2K 5% 1/4W	
R223	1-249-405-11	CARBON 100 5% 1/4W	
R224	1-249-405-11	CARBON 100 5% 1/4W	
R225	1-249-405-11	CARBON 100 5% 1/4W	
R226	1-249-421-11	CARBON 2.2K 5% 1/4W	
R227	1-215-393-00	METAL 68 1% 1/6W	
R228	1-215-393-00	METAL 68 1% 1/6W	
R229	1-249-405-11	CARBON 100 5% 1/4W	
R230	1-249-417-11	CARBON 1K 5% 1/4W	
R231	1-249-427-11	CARBON 6.8K 5% 1/4W	
R232	1-249-405-11	CARBON 100 5% 1/4W	
R233	1-249-435-11	CARBON 33K 5% 1/4W	
R234	1-249-421-11	CARBON 2.2K 5% 1/4W	
R235	1-249-417-11	CARBON 1K 5% 1/4W	
R236	1-215-393-00	METAL 68 1% 1/6W	
R237	1-249-405-11	CARBON 100 5% 1/4W	
R238	1-249-437-11	CARBON 47K 5% 1/4W	
R239	1-249-437-11	CARBON 47K 5% 1/4W	
R240	1-249-437-11	CARBON 47K 5% 1/4W	
R241	1-249-437-11	CARBON 47K 5% 1/4W	
R242	1-249-437-11	CARBON 47K 5% 1/4W	
R243	1-249-427-11	CARBON 6.8K 5% 1/4W	
R244	1-249-427-11	CARBON 6.8K 5% 1/4W	
R245	1-249-427-11	CARBON 6.8K 5% 1/4W	
R246	1-249-427-11	CARBON 6.8K 5% 1/4W	
R247	1-249-427-11	CARBON 6.8K 5% 1/4W	
R248	1-249-427-11	CARBON 6.8K 5% 1/4W	
R249	1-249-405-11	CARBON 100 5% 1/4W	
R250	1-249-405-11	CARBON 100 5% 1/4W	
R251	1-249-427-11	CARBON 6.8K 5% 1/4W	
R252	1-249-427-11	CARBON 6.8K 5% 1/4W	
R253	1-249-427-11	CARBON 6.8K 5% 1/4W	
R254	1-249-427-11	CARBON 6.8K 5% 1/4W	
R255	1-249-437-11	CARBON 47K 5% 1/4W	

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

REF.NO.	PART NO.	DESCRIPTION				REMARK
R256	1-249-437-11	CARBON	47K	5%	1/4W	
R257	1-249-437-11	CARBON	47K	5%	1/4W	
R258	1-249-437-11	CARBON	47K	5%	1/4W	
R259	1-249-393-11	CARBON	10	5%	1/4W	
R260	1-249-405-11	CARBON	100	5%	1/4W	
R261	1-247-901-11	CARBON	820K	5%	1/4W	
R263	1-249-441-11	CARBON	100K	5%	1/4W	
R301	1-215-447-00	METAL	12K	1%	1/6W	
R302	1-215-442-00	METAL	7.5K	1%	1/6W	
R303	1-215-427-00	METAL	1.8K	1%	1/6W	
R304	1-215-447-00	METAL	12K	1%	1/6W	
R305	1-247-903-00	CARBON	1M	5%	1/4W	
R306	1-215-447-00	METAL	12K	1%	1/6W	
R307	1-215-447-00	METAL	12K	1%	1/6W	
R308	1-215-442-00	METAL	7.5K	1%	1/6W	
R309	1-215-427-00	METAL	1.8K	1%	1/6W	
R310	1-247-903-00	CARBON	1M	5%	1/4W	
R311	1-249-441-11	CARBON	100K	5%	1/4W	
R312	1-215-447-00	METAL	12K	1%	1/6W	
R313	1-215-442-00	METAL	7.5K	1%	1/6W	
R314	1-215-427-00	METAL	1.8K	1%	1/6W	
R315	1-215-447-00	METAL	12K	1%	1/6W	
R316	1-247-903-00	CARBON	1M	5%	1/4W	
R317	1-249-429-11	CARBON	10K	5%	1/4W	
R318	1-249-405-11	CARBON	100	5%	1/4W	

<SWITCH>

REF.NO.	PART NO.	DESCRIPTION	REMARK
S1	*1-561-724-00	SOCKET, CONNECTOR 2P	
S1	*1-564-431-11	POST, CONNECTOR 3P	

****

*1-617-480-11 P BOARD
****

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
P1	*1-508-768-00	PIN, CONNECTOR (5MM PITCH) 6P	

****

*A-1240-658-A F BOARD, COMPLETE
****

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
C1	⚠.1-130-712-11	FILM	0.47MF	20%	250V	
C2	⚠.1-161-742-51	CERAMIC	0.0022MF	20%	400V	
C3	⚠.1-161-742-51	CERAMIC	0.0022MF	20%	400V	
C5	⚠.1-161-742-51	CERAMIC	0.0022MF	20%	400V	
C6	⚠.1-161-742-51	CERAMIC	0.0022MF	20%	400V	
C8	⚠.1-130-711-11	FILM	0.22MF	20%	250V	
C9	1-162-599-12	CERAMIC	0.0047MF	20%	400V	
C10	1-162-599-12	CERAMIC	0.0047MF	20%	400V	
C11	1-162-599-12	CERAMIC	0.0047MF	20%	400V	
C12	1-162-599-12	CERAMIC	0.0047MF	20%	400V	
C13	1-125-295-00	ELECT(BLOCK)	560MF	20%	200V	
C14	1-125-295-00	ELECT(BLOCK)	560MF	20%	200V	
C15	1-106-371-00	MYLAR	0.015MF	10%	200V	
C16	1-130-485-00	MYLAR	0.015MF	5%	50V	
C17	1-136-201-11	FILM	0.22MF	10%	400V	
C18	1-130-479-00	MYLAR	0.0047MF	5%	50V	
C19	1-123-381-00	ELECT	2.2MF	20%	50V	
C21	1-123-333-00	ELECT	100MF	20%	25V	
C22	1-101-001-00	CERAMIC	0.001MF		50V	

<DIODE>

REF.NO.	PART NO.	DESCRIPTION	REMARK
D1	8-719-003-08	THYRISTOR CR3CM-8	
D2	8-719-503-06	DIODE S3WB60Z	
D3	8-719-971-20	DIODE ERC38-06	
D4	8-719-971-20	DIODE ERC38-06	
D5	8-719-815-85	DIODE 1S1585	
D6	8-719-815-85	DIODE 1S1585	
D7	8-719-815-85	DIODE 1S1585	
D8	8-719-109-85	DIODE RD5.1ES-B2	
D9	8-719-971-20	DIODE ERC38-06	
D10	8-719-110-17	DIODE RD10ES-B2	

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
F1	*1-508-784-00	PIN, CONNECTOR (5MM PITCH) 1P	
F2	*1-506-348-99	PIN, CONNECTOR 3P	
F3	*1-506-371-00	PIN, CONNECTOR 2P	
F5	*1-508-767-00	PIN, CONNECTOR (5MM PITCH) 5P	
F6	*1-566-054-11	PIN, CONNECTOR 2P	
F7	*1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P	
F8	*1-506-348-99	PIN, CONNECTOR 3P	
F9	*1-506-348-99	PIN, CONNECTOR 3P	
F10	*1-566-055-11	PIN, CONNECTOR 3P	

<IC>

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC1	8-719-902-56	DIODE PC817	

<NEON LAMP>

REF.NO.	PART NO.	DESCRIPTION	REMARK
NL1	1-519-331-11	LAMP, NEON 3P	

<IC LINK>

REF.NO.	PART NO.	DESCRIPTION	REMARK
PS1	1-532-605-00	LINK, IC	

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q1	8-729-175-22	TRANSISTOR 2SC2752-L	
Q2	8-729-105-97	TRANSISTOR 2SA1156-2K	

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
R1	⚠.1-202-730-51	SOLID	8.2M	10%	1/2W	
R2	⚠.1-202-845-51	SOLID	390K	10%	1/2W	
R3	⚠.1-217-296-11	WIREWOUND	6.8	10%	5W	F
R4	1-249-437-11	CARBON	47K	5%	1/4W	
R5	1-249-492-11	CARBON	47K	5%	1/2W	
R6	1-249-437-11	CARBON	47K	5%	1/4W	
R7	1-249-421-11	CARBON	2.2K	5%	1/4W	
R8	1-247-903-00	CARBON	1M	5%	1/4W	
R9	1-247-903-00	CARBON	1M	5%	1/4W	
R10	1-247-903-00	CARBON	1M	5%	1/4W	
R11	1-249-409-11	CARBON	220	5%	1/4W	F
R12	1-249-403-11	CARBON	68	5%	1/4W	F
R13	1-249-409-11	CARBON	220	5%	1/4W	F
R14	1-249-425-11	CARBON	4.7K	5%	1/4W	
R15	1-249-405-11	CARBON	100	5%	1/4W	
R16	1-249-417-11	CARBON	1K	5%	1/4W	
R17	1-217-337-00	WIREWOUND	22	10%	7W	F

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite. Ne les remplacer que par une piece portant le numero specifie.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

F FA QC

<RELAY>

REF.NO.	PART NO.	DESCRIPTION	REMARK
RY1	⚠ 1-515-491-11	RELAY (POWER)	

<TRANSFORMER>

REF.NO.	PART NO.	DESCRIPTION	REMARK
T1	⚠ 1-421-662-11	LFT	
T2	⚠ 1-421-662-11	LFT	
T3	⚠ 1-447-426-12	TRANSFORMER, CONVERTER	

<THERMISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
TH1	⚠ 1-800-820-12	THERMISTOR, POWER	
THP1	⚠ 1-800-686-33	THERMISTOR (POSITIVE)	
THP2	⚠ 1-806-387-12	THERMISTOR (POSITIVE)	

****

*1-633-260-11 FA BOARD
****

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
FA1	*1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P	
FA2	*1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P	

****

*A-1275-069-A QC BOARD, COMPLETE
****

1-536-992-11 TERMINAL BOARD, INPUT/OUTPUT

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
C101	1-161-021-11	CERAMIC	0.047MF	10%	25V	
C102	1-124-631-11	ELECT	47MF	20%	16V	
C103	1-101-004-00	CERAMIC	0.01MF		50V	
C104	1-123-332-00	ELECT	47MF	20%	16V	
C106	1-102-934-00	CERAMIC	1PF	0.25PF	50V	
C107	1-102-934-00	CERAMIC	1PF	0.25PF	50V	
C108	1-124-631-11	ELECT	47MF	20%	16V	
C109	1-101-004-00	CERAMIC	0.01MF		50V	
C110	1-161-021-11	CERAMIC	0.047MF	10%	25V	
C111	1-124-631-11	ELECT	47MF	20%	16V	
C112	1-101-004-00	CERAMIC	0.01MF		50V	
C113	1-161-021-11	CERAMIC	0.047MF	10%	25V	
C130	1-101-004-00	CERAMIC	0.01MF		50V	
C131	1-124-963-11	ELECT	33MF	20%	16V	
C132	1-101-004-00	CERAMIC	0.01MF		50V	
C133	1-124-963-11	ELECT	33MF	20%	16V	
C134	1-101-004-00	CERAMIC	0.01MF		50V	
C135	1-124-963-11	ELECT	33MF	20%	16V	
C136	1-101-004-00	CERAMIC	0.01MF		50V	
C137	1-124-963-11	ELECT	33MF	20%	16V	
C138	1-101-004-00	CERAMIC	0.01MF		50V	
C139	1-124-963-11	ELECT	33MF	20%	16V	
C140	1-101-004-00	CERAMIC	0.01MF		50V	
C141	1-124-963-11	ELECT	33MF	20%	16V	
C142	1-101-004-00	CERAMIC	0.01MF		50V	
C143	1-101-004-00	CERAMIC	0.01MF		50V	
C144	1-101-004-00	CERAMIC	0.01MF		50V	
C145	1-101-004-00	CERAMIC	0.01MF		50V	
C146	1-101-004-00	CERAMIC	0.01MF		50V	

<TRIMMER>

REF.NO.	PART NO.	DESCRIPTION	REMARK
CV101	1-141-179-12	CAP,TRIMMER	

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q101	8-729-105-88	TRANSISTOR 2SC2570A	
Q102	8-729-105-88	TRANSISTOR 2SC2570A	
Q103	8-729-103-19	TRANSISTOR 2SA1206-KI	
Q104	8-729-105-88	TRANSISTOR 2SC2570A	
Q105	8-729-105-88	TRANSISTOR 2SC2570A	
Q106	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q107	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q108	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q109	8-729-119-78	TRANSISTOR 2SC2785-HFE	

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
QC1	*1-564-465-11	CONNECTOR (LIGHT ANGLE) 22P	
QC2	*1-566-058-11	PIN, CONNECTOR 6P	

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
R101	1-249-417-11	CARBON	1K	5%	1/4W	
R102	1-249-417-11	CARBON	1K	5%	1/4W	
R103	1-215-440-00	METAL	6.2K	1%	1/6W	
R104	1-215-447-00	METAL	12K	1%	1/6W	
R105	1-215-445-00	METAL	10K	1%	1/6W	
R106	1-215-448-00	METAL	13K	1%	1/6W	
R107	1-215-429-00	METAL	2.2K	1%	1/6W	
R108	1-215-421-00	METAL	1K	1%	1/6W	
R109	1-215-437-00	METAL	4.7K	1%	1/6W	
R110	1-215-397-00	METAL	100	1%	1/6W	
R111	1-249-405-11	CARBON	100	5%	1/4W	
R112	1-249-420-11	CARBON	1.8K	5%	1/4W	
R113	1-215-421-00	METAL	1K	1%	1/6W	
R114	1-214-702-00	METAL	75	1%	1/4W	
R115	1-249-417-11	CARBON	1K	5%	1/4W	
R116	1-249-405-11	CARBON	100	5%	1/4W	
R117	1-249-431-11	CARBON	15K	5%	1/4W	
R118	1-249-427-11	CARBON	6.8K	5%	1/4W	
R119	1-249-439-11	CARBON	68K	5%	1/4W	
R121	1-249-425-11	CARBON	4.7K	5%	1/4W	
R122	1-214-702-00	METAL	75	1%	1/4W	
R123	1-249-417-11	CARBON	1K	5%	1/4W	
R124	1-249-405-11	CARBON	100	5%	1/4W	
R125	1-249-427-11	CARBON	6.8K	5%	1/4W	
R126	1-249-431-11	CARBON	15K	5%	1/4W	
R127	1-249-439-11	CARBON	68K	5%	1/4W	
R128	1-249-405-11	CARBON	100	5%	1/4W	
R129	1-249-425-11	CARBON	4.7K	5%	1/4W	
R131	1-247-104-00	CARBON	75	5%	1/4W	
R132	1-247-104-00	CARBON	75	5%	1/4W	
R133	1-247-804-11	CARBON	75	5%	1/4W	
R134	1-249-421-11	CARBON	2.2K	5%	1/4W	
R135	1-249-421-11	CARBON	2.2K	5%	1/4W	
R136	1-249-421-11	CARBON	2.2K	5%	1/4W	
R137	1-249-421-11	CARBON	2.2K	5%	1/4W	
R138	1-249-421-11	CARBON	2.2K	5%	1/4W	
R140	1-249-405-11	CARBON	100	5%	1/4W	

<VARIABLE RESISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
RV101	1-237-516-21	RES, ADJ, CERMET 2K	

****

*1-617-479-11 QD BOARD
****

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
QD2	1-563-265-11	CONNECTOR, MULTIPLE 10P	

****

*A-1275-089-A QA BOARD, COMPLETE
****

1-537-174-11 TERMINAL BOARD, INPUT/OUTPUT

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
C101	1-161-021-11	CERAMIC	0.047MF	10%	25V	
C102	1-124-631-11	ELECT	47MF	20%	16V	
C103	1-101-004-00	CERAMIC	0.01MF		50V	
C104	1-123-332-00	ELECT	47MF	20%	16V	
C105	1-102-934-00	CERAMIC	1PF	0.25PF	50V	
C106	1-102-934-00	CERAMIC	1PF	0.25PF	50V	
C107	1-161-021-11	CERAMIC	0.047MF	10%	25V	
C108	1-124-631-11	ELECT	47MF	20%	16V	
C109	1-101-004-00	CERAMIC	0.01MF		50V	
C110	1-123-332-00	ELECT	47MF	20%	16V	
C111	1-102-934-00	CERAMIC	1PF	0.25PF	50V	
C112	1-102-934-00	CERAMIC	1PF	0.25PF	50V	
C113	1-161-021-11	CERAMIC	0.047MF	10%	25V	
C114	1-124-631-11	ELECT	47MF	20%	16V	
C115	1-101-004-00	CERAMIC	0.01MF		50V	
C116	1-123-332-00	ELECT	47MF	20%	16V	
C117	1-102-934-00	CERAMIC	1PF	0.25PF	50V	
C118	1-102-934-00	CERAMIC	1PF	0.25PF	50V	
C128	1-124-963-11	ELECT	33MF	20%	16V	
C129	1-101-004-00	CERAMIC	0.01MF		50V	
C130	1-101-004-00	CERAMIC	0.01MF		50V	
C131	1-124-963-11	ELECT	33MF	20%	16V	
C132	1-124-963-11	ELECT	33MF	20%	16V	
C133	1-101-004-00	CERAMIC	0.01MF		50V	
C134	1-101-004-00	CERAMIC	0.01MF		50V	
C135	1-124-963-11	ELECT	33MF	20%	16V	
C136	1-124-963-11	ELECT	33MF	20%	16V	
C137	1-101-004-00	CERAMIC	0.01MF		50V	
C138	1-101-004-00	CERAMIC	0.01MF		50V	
C139	1-124-963-11	ELECT	33MF	20%	16V	

<TRIMMER>

REF.NO.	PART NO.	DESCRIPTION	REMARK
CV101	1-141-179-12	CAP,TRIMMER	
CV102	1-141-179-12	CAP,TRIMMER	
CV103	1-141-179-12	CAP,TRIMMER	

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q101	8-729-105-88	TRANSISTOR 2SC2570A	
Q102	8-729-105-88	TRANSISTOR 2SC2570A	
Q103	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q104	8-729-105-88	TRANSISTOR 2SC2570A	
Q105	8-729-105-88	TRANSISTOR 2SC2570A	
Q106	8-729-105-88	TRANSISTOR 2SC2570A	
Q107	8-729-105-88	TRANSISTOR 2SC2570A	
Q108	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q109	8-729-105-88	TRANSISTOR 2SC2570A	
Q110	8-729-105-88	TRANSISTOR 2SC2570A	
Q111	8-729-105-88	TRANSISTOR 2SC2570A	
Q112	8-729-105-88	TRANSISTOR 2SC2570A	
Q113	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q114	8-729-105-88	TRANSISTOR 2SC2570A	
Q115	8-729-105-88	TRANSISTOR 2SC2570A	

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
QA1	*1-564-464-11	CONNECTOR (LIGHT ANGLE) 15P	

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
R101	1-249-417-11	CARBON	1K	5%	1/4W	
R102	1-249-417-11	CARBON	1K	5%	1/4W	
R103	1-215-440-00	METAL	6.2K	1%	1/6W	
R104	1-215-447-00	METAL	12K	1%	1/6W	
R105	1-215-445-00	METAL	10K	1%	1/6W	
R106	1-215-448-00	METAL	13K	1%	1/6W	
R107	1-215-429-00	METAL	2.2K	1%	1/6W	
R108	1-215-421-00	METAL	1K	1%	1/6W	
R109	1-215-437-00	METAL	4.7K	1%	1/6W	
R110	1-249-405-11	CARBON	100	5%	1/4W	
R111	1-215-397-00	METAL	100	1%	1/6W	
R112	1-249-420-11	CARBON	1.8K	5%	1/4W	
R113	1-215-421-00	METAL	1K	1%	1/6W	
R114	1-249-417-11	CARBON	1K	5%	1/4W	
R115	1-249-417-11	CARBON	1K	5%	1/4W	
R116	1-215-440-00	METAL	6.2K	1%	1/6W	
R117	1-215-447-00	METAL	12K	1%	1/6W	
R118	1-215-445-00	METAL	10K	1%	1/6W	
R119	1-215-448-00	METAL	13K	1%	1/6W	
R120	1-215-429-00	METAL	2.2K	1%	1/6W	
R121	1-215-421-00	METAL	1K	1%	1/6W	
R122	1-215-437-00	METAL	4.7K	1%	1/6W	
R123	1-249-405-11	CARBON	100	5%	1/4W	
R124	1-215-397-00	METAL	100	1%	1/6W	
R125	1-249-420-11	CARBON	1.8K	5%	1/4W	
R126	1-215-421-00	METAL	1K	1%	1/6W	
R127	1-249-417-11	CARBON	1K	5%	1/4W	
R128	1-249-417-11	CARBON	1K	5%	1/4W	
R129	1-215-440-00	METAL	6.2K	1%	1/6W	
R130	1-215-447-00	METAL	12K	1%	1/6W	
R131	1-215-445-00	METAL	10K	1%	1/6W	
R132	1-215-448-00	METAL	13K	1%	1/6W	
R133	1-215-429-00	METAL	2.2K	1%	1/6W	
R134	1-215-421-00	METAL	1K	1%	1/6W	
R135	1-215-437-00	METAL	4.7K	1%	1/6W	
R136	1-249-405-11	CARBON	100	5%	1/4W	
R137	1-215-397-00	METAL	100	1%	1/6W	
R138	1-249-420-11	CARBON	1.8K	5%	1/4W	
R139	1-215-421-00	METAL	1K	1%	1/6W	
R140	1-249-405-11	CARBON	100	5%	1/4W	
R141	1-249-405-11	CARBON	100	5%	1/4W	
R142	1-249-405-11	CARBON	100	5%	1/4W	
R143	1-249-405-11	CARBON	100	5%	1/4W	
R144	1-249-405-11	CARBON	100	5%	1/4W	
R145	1-249-405-11	CARBON	100	5%	1/4W	
R146	1-247-804-11	CARBON	75	5%	1/4W	
R147	1-247-804-11	CARBON	75	5%	1/4W	
R148	1-247-804-11	CARBON	75	5%	1/4W	

REF.NO.	PART NO.	DESCRIPTION	REMARK
		<VARIABLE RESISTOR>	
RV101	1-237-516-21	RES, ADJ, CERMET 2K	
RV102	1-237-516-21	RES, ADJ, CERMET 2K	
RV103	1-237-516-21	RES, ADJ, CERMET 2K	

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*A-1275-090-A QB BOARD, COMPLETE
****

REF.NO.	PART NO.	DESCRIPTION	REMARK
	1-537-174-21	TERMINAL BOARD, INPUT/OUTPUT	
		<CAPACITOR>	
C101	1-161-021-11	CERAMIC 0.047MF 10% 25V	
C102	1-124-631-11	ELECT 47MF 20% 16V	
C103	1-101-004-00	CERAMIC 0.01MF 50V	
C104	1-123-332-00	ELECT 47MF 20% 16V	
C105	1-102-934-00	CERAMIC 1PF 0.25PF 50V	
C106	1-102-934-00	CERAMIC 1PF 0.25PF 50V	
C107	1-161-021-11	CERAMIC 0.047MF 10% 25V	
C108	1-124-631-11	ELECT 47MF 20% 16V	
C109	1-101-004-00	CERAMIC 0.01MF 50V	
C110	1-123-332-00	ELECT 47MF 20% 16V	
C111	1-102-934-00	CERAMIC 1PF 0.25PF 50V	
C112	1-102-934-00	CERAMIC 1PF 0.25PF 50V	
C113	1-161-021-11	CERAMIC 0.047MF 10% 25V	
C114	1-124-631-11	ELECT 47MF 20% 16V	
C115	1-101-004-00	CERAMIC 0.01MF 50V	
C116	1-123-332-00	ELECT 47MF 20% 16V	
C117	1-102-934-00	CERAMIC 1PF 0.25PF 50V	
C118	1-102-934-00	CERAMIC 1PF 0.25PF 50V	
C128	1-124-963-11	ELECT 33MF 20% 16V	
C129	1-101-004-00	CERAMIC 0.01MF 50V	
C130	1-101-004-00	CERAMIC 0.01MF 50V	
C131	1-124-963-11	ELECT 33MF 20% 16V	
C132	1-124-963-11	ELECT 33MF 20% 16V	
C133	1-101-004-00	CERAMIC 0.01MF 50V	
C134	1-101-004-00	CERAMIC 0.01MF 50V	
C135	1-124-963-11	ELECT 33MF 20% 16V	
C136	1-124-963-11	ELECT 33MF 20% 16V	
C137	1-101-004-00	CERAMIC 0.01MF 50V	
C138	1-101-004-00	CERAMIC 0.01MF 50V	
C139	1-124-963-11	ELECT 33MF 20% 16V	
		<TRIMMER>	
CV101	1-141-179-12	CAP,TRIMMER	
CV102	1-141-179-12	CAP,TRIMMER	
CV103	1-141-179-12	CAP,TRIMMER	
		<TRANSISTOR>	
Q101	8-729-105-88	TRANSISTOR 2SC2570A	
Q102	8-729-105-88	TRANSISTOR 2SC2570A	
Q103	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q104	8-729-105-88	TRANSISTOR 2SC2570A	
Q105	8-729-105-88	TRANSISTOR 2SC2570A	
Q106	8-729-105-88	TRANSISTOR 2SC2570A	
Q107	8-729-105-88	TRANSISTOR 2SC2570A	
Q108	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q109	8-729-105-88	TRANSISTOR 2SC2570A	
Q110	8-729-105-88	TRANSISTOR 2SC2570A	
Q111	8-729-105-88	TRANSISTOR 2SC2570A	
Q112	8-729-105-88	TRANSISTOR 2SC2570A	
Q113	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q114	8-729-105-88	TRANSISTOR 2SC2570A	
Q115	8-729-105-88	TRANSISTOR 2SC2570A	
		<CONNECTOR>	
QB1	*1-564-464-11	CONNECTOR (LIGHT ANGLE) 15P	
		<RESISTOR>	
R101	1-249-417-11	CARBON 1K 5% 1/4W	
R102	1-249-417-11	CARBON 1K 5% 1/4W	
R103	1-215-440-00	METAL 6.2K 1% 1/6W	
R104	1-215-447-00	METAL 12K 1% 1/6W	
R105	1-215-445-00	METAL 10K 1% 1/6W	
R106	1-215-448-00	METAL 13K 1% 1/6W	
R107	1-215-429-00	METAL 2.2K 1% 1/6W	
R108	1-215-421-00	METAL 1K 1% 1/6W	
R109	1-215-437-00	METAL 4.7K 1% 1/6W	
R110	1-249-405-11	CARBON 100 5% 1/4W	
R111	1-215-397-00	METAL 100 1% 1/6W	
R112	1-249-420-11	CARBON 1.8K 5% 1/4W	
R113	1-215-421-00	METAL 1K 1% 1/6W	
R114	1-249-417-11	CARBON 1K 5% 1/4W	
R115	1-249-417-11	CARBON 1K 5% 1/4W	
R116	1-215-440-00	METAL 6.2K 1% 1/6W	
R117	1-215-447-00	METAL 12K 1% 1/6W	
R118	1-215-445-00	METAL 10K 1% 1/6W	
R119	1-215-448-00	METAL 13K 1% 1/6W	
R120	1-215-429-00	METAL 2.2K 1% 1/6W	
R121	1-215-421-00	METAL 1K 1% 1/6W	
R122	1-215-437-00	METAL 4.7K 1% 1/6W	
R123	1-249-405-11	CARBON 100 5% 1/4W	
R124	1-215-397-00	METAL 100 1% 1/6W	
R125	1-249-420-11	CARBON 1.8K 5% 1/4W	
R126	1-215-421-00	METAL 1K 1% 1/6W	
R127	1-249-417-11	CARBON 1K 5% 1/4W	
R128	1-249-417-11	CARBON 1K 5% 1/4W	
R129	1-215-440-00	METAL 6.2K 1% 1/6W	
R130	1-215-447-00	METAL 12K 1% 1/6W	
R131	1-215-445-00	METAL 10K 1% 1/6W	
R132	1-215-448-00	METAL 13K 1% 1/6W	
R133	1-215-429-00	METAL 2.2K 1% 1/6W	
R134	1-215-421-00	METAL 1K 1% 1/6W	
R135	1-215-437-00	METAL 4.7K 1% 1/6W	
R136	1-249-405-11	CARBON 100 5% 1/4W	
R137	1-215-397-00	METAL 100 1% 1/6W	
R138	1-249-420-11	CARBON 1.8K 5% 1/4W	
R139	1-215-421-00	METAL 1K 1% 1/6W	
R140	1-249-405-11	CARBON 100 5% 1/4W	
R141	1-249-405-11	CARBON 100 5% 1/4W	
R142	1-249-405-11	CARBON 100 5% 1/4W	
R143	1-249-405-11	CARBON 100 5% 1/4W	
R144	1-249-405-11	CARBON 100 5% 1/4W	
R145	1-249-405-11	CARBON 100 5% 1/4W	
R146	1-247-804-11	CARBON 75 5% 1/4W	
R147	1-247-804-11	CARBON 75 5% 1/4W	
R148	1-247-804-11	CARBON 75 5% 1/4W	
		<VARIABLE RESISTOR>	
RV101	1-237-516-21	RES, ADJ, CERMET 2K	
RV102	1-237-516-21	RES, ADJ, CERMET 2K	
RV103	1-237-516-21	RES, ADJ, CERMET 2K	

****

*1-633-259-11 BN BOARD
****

REF.NO.	PART NO.	DESCRIPTION	REMARK
	1-507-751-00	JACK, PIN 1P	
	4-378-915-01	NUT (M2.6), PLATE	

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
BN1	*1-562-768-11	RECEPTACLE,MULTI CONNECTOR 64P	
BN2	*1-562-768-11	RECEPTACLE,MULTI CONNECTOR 64P	
BN3	*1-562-768-11	RECEPTACLE,MULTI CONNECTOR 64P	
BN4	*1-562-768-11	RECEPTACLE,MULTI CONNECTOR 64P	
BN5	*1-562-768-11	RECEPTACLE,MULTI CONNECTOR 64P	
BN6	*1-562-768-11	RECEPTACLE,MULTI CONNECTOR 64P	
BN7	*1-562-768-11	RECEPTACLE,MULTI CONNECTOR 64P	
BN8	*1-566-045-11	PIN, CONNECTOR 6P	
BN11	*1-566-041-11	PIN, CONNECTOR 2P	
BN12	*1-566-044-11	PIN, CONNECTOR 5P	
BN13	*1-566-043-11	PIN, CONNECTOR 4P	
BN14	*1-566-043-11	PIN, CONNECTOR 4P	
BN16	*1-566-047-11	PIN, CONNECTOR 8P	
BN17	*1-566-041-11	PIN, CONNECTOR 2P	
BN18	*1-566-042-11	PIN, CONNECTOR 3P	
BN19	*1-566-043-11	PIN, CONNECTOR 4P	
BN20	*1-566-047-11	PIN, CONNECTOR 8P	
BN21	*1-566-045-11	PIN, CONNECTOR 6P	

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*A-1296-079-A BD BOARD, COMPLETE
****

REF.NO.	PART NO.	DESCRIPTION	REMARK
	*4-353-708-00	HOOK, FINGER	
	4-378-915-01	NUT (M2.6), PLATE	

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
BD1	*1-562-729-11	CONNECTOR, MULTI 64P	

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
C001	1-123-382-00	ELECT	3.3MF	20%	50V	
C002	1-123-382-00	ELECT	3.3MF	20%	50V	
C003	1-123-382-00	ELECT	3.3MF	20%	50V	
C004	1-123-382-00	ELECT	3.3MF	20%	50V	
C005	1-123-382-00	ELECT	3.3MF	20%	50V	
C006	1-123-382-00	ELECT	3.3MF	20%	50V	
C009	1-101-004-00	CERAMIC	0.01MF		50V	
C011	1-126-517-11	ELECT	220MF	20%	25V	
C012	1-124-126-00	ELECT	47MF	20%	25V	
C013	1-101-004-00	CERAMIC	0.01MF		50V	
C014	1-101-004-00	CERAMIC	0.01MF		50V	
C016	1-126-517-11	ELECT	220MF	20%	25V	
C017	1-124-126-00	ELECT	47MF	20%	25V	
C018	1-101-004-00	CERAMIC	0.01MF		50V	
C019	1-101-004-00	CERAMIC	0.01MF		50V	
C101	1-126-101-11	ELECT	100MF	20%	16V	
C102	1-101-004-00	CERAMIC	0.01MF		50V	
C103	1-126-101-11	ELECT	100MF	20%	16V	
C104	1-101-004-00	CERAMIC	0.01MF		50V	
C105	1-102-942-00	CERAMIC	5PF	1PF	50V	
C106	1-124-963-11	ELECT	33MF	20%	16V	
C107	1-136-173-00	FILM	0.47MF	5%	50V	
C108	1-136-173-00	FILM	0.47MF	5%	50V	
C109	1-101-004-00	CERAMIC	0.01MF		50V	
C110	1-123-330-00	ELECT	22MF	20%	25V	
C111	1-123-330-00	ELECT	22MF	20%	25V	
C112	1-123-330-00	ELECT	22MF	20%	25V	
C113	1-123-330-00	ELECT	22MF	20%	25V	
C114	1-124-963-11	ELECT	33MF	20%	16V	
C115	1-101-004-00	CERAMIC	0.01MF		50V	
C116	1-124-963-11	ELECT	33MF	20%	16V	
C117	1-101-004-00	CERAMIC	0.01MF		50V	
C118	1-124-963-11	ELECT	33MF	20%	16V	
C119	1-136-169-00	FILM	0.22MF	5%	50V	
C120	1-101-004-00	CERAMIC	0.01MF		50V	
C121	1-123-381-00	ELECT	2.2MF	20%	50V	
C122	1-101-004-00	CERAMIC	0.01MF		50V	
C123	1-102-942-00	CERAMIC	5PF	1PF	50V	
C124	1-123-330-00	ELECT	22MF	20%	25V	
C125	1-123-330-00	ELECT	22MF	20%	25V	
C126	1-136-173-00	FILM	0.47MF	5%	50V	
C127	1-101-004-00	CERAMIC	0.01MF		50V	
C128	1-136-173-00	FILM	0.47MF	5%	50V	
C129	1-101-004-00	CERAMIC	0.01MF		50V	
C131	1-101-004-00	CERAMIC	0.01MF		50V	
C132	1-101-004-00	CERAMIC	0.01MF		50V	
C133	1-101-004-00	CERAMIC	0.01MF		50V	
C134	1-101-888-00	CERAMIC	68PF	5%	50V	
C135	1-101-004-00	CERAMIC	0.01MF		50V	
C137	1-102-951-00	CERAMIC	15PF	5%	50V	
C138	1-101-004-00	CERAMIC	0.01MF		50V	
C139	1-101-004-00	CERAMIC	0.01MF		50V	
C201	1-126-101-11	ELECT	100MF	20%	16V	
C202	1-101-004-00	CERAMIC	0.01MF		50V	
C203	1-126-101-11	ELECT	100MF	20%	16V	
C204	1-101-004-00	CERAMIC	0.01MF		50V	
C205	1-102-942-00	CERAMIC	5PF	1PF	50V	
C206	1-124-963-11	ELECT	33MF	20%	16V	
C207	1-136-173-00	FILM	0.47MF	5%	50V	
C208	1-136-173-00	FILM	0.47MF	5%	50V	
C209	1-101-004-00	CERAMIC	0.01MF		50V	
C210	1-123-330-00	ELECT	22MF	20%	25V	
C211	1-123-330-00	ELECT	22MF	20%	25V	
C212	1-123-330-00	ELECT	22MF	20%	25V	
C213	1-123-330-00	ELECT	22MF	20%	25V	
C214	1-124-963-11	ELECT	33MF	20%	16V	
C215	1-101-004-00	CERAMIC	0.01MF		50V	
C216	1-124-963-11	ELECT	33MF	20%	16V	
C217	1-101-004-00	CERAMIC	0.01MF		50V	
C218	1-124-963-11	ELECT	33MF	20%	16V	
C219	1-136-169-00	FILM	0.22MF	5%	50V	
C220	1-101-004-00	CERAMIC	0.01MF		50V	
C221	1-123-381-00	ELECT	2.2MF	20%	50V	
C222	1-101-004-00	CERAMIC	0.01MF		50V	
C223	1-102-942-00	CERAMIC	5PF	1PF	50V	
C224	1-123-330-00	ELECT	22MF	20%	25V	
C225	1-123-330-00	ELECT	22MF	20%	25V	
C226	1-136-173-00	FILM	0.47MF	5%	50V	
C227	1-101-004-00	CERAMIC	0.01MF		50V	
C228	1-136-173-00	FILM	0.47MF	5%	50V	
C229	1-101-004-00	CERAMIC	0.01MF		50V	
C231	1-101-004-00	CERAMIC	0.01MF		50V	
C232	1-101-004-00	CERAMIC	0.01MF		50V	
C233	1-101-004-00	CERAMIC	0.01MF		50V	
C234	1-101-888-00	CERAMIC	68PF	5%	50V	
C235	1-101-004-00	CERAMIC	0.01MF		50V	

BD

REF.NO.	PART NO.	DESCRIPTION			REMARK
C237	1-102-951-00	CERAMIC	15PF	5%	50V
C238	1-101-004-00	CERAMIC	0.01MF		50V
C239	1-101-004-00	CERAMIC	0.01MF		50V
C301	1-126-101-11	ELECT	100MF	20%	16V
C302	1-101-004-00	CERAMIC	0.01MF		50V
C303	1-126-101-11	ELECT	100MF	20%	16V
C304	1-101-004-00	CERAMIC	0.01MF		50V
C305	1-102-942-00	CERAMIC	5PF	1PF	50V
C306	1-124-963-11	ELECT	33MF	20%	16V
C307	1-136-173-00	FILM	0.47MF	5%	50V
C308	1-136-173-00	FILM	0.47MF	5%	50V
C309	1-101-004-00	CERAMIC	0.01MF		50V
C310	1-123-330-00	ELECT	22MF	20%	25V
C311	1-123-330-00	ELECT	22MF	20%	25V
C312	1-123-330-00	ELECT	22MF	20%	25V
C313	1-123-330-00	ELECT	22MF	20%	25V
C314	1-124-963-11	ELECT	33MF	20%	16V
C315	1-101-004-00	CERAMIC	0.01MF		50V
C316	1-124-963-11	ELECT	33MF	20%	16V
C317	1-101-004-00	CERAMIC	0.01MF		50V
C318	1-124-963-11	ELECT	33MF	20%	16V
C319	1-136-169-00	FILM	0.22MF	5%	50V
C320	1-101-004-00	CERAMIC	0.01MF		50V
C321	1-123-381-00	ELECT	2.2MF	20%	50V
C322	1-101-004-00	CERAMIC	0.01MF		50V
C323	1-102-942-00	CERAMIC	5PF	1PF	50V
C324	1-123-330-00	ELECT	22MF	20%	25V
C325	1-123-330-00	ELECT	22MF	20%	25V
C326	1-136-173-00	FILM	0.47MF	5%	50V
C327	1-101-004-00	CERAMIC	0.01MF		50V
C328	1-136-173-00	FILM	0.47MF	5%	50V
C329	1-101-004-00	CERAMIC	0.01MF		50V
C331	1-101-004-00	CERAMIC	0.01MF		50V
C332	1-101-004-00	CERAMIC	0.01MF		50V
C333	1-101-004-00	CERAMIC	0.01MF		50V
C334	1-101-888-00	CERAMIC	68PF	5%	50V
C335	1-101-004-00	CERAMIC	0.01MF		50V
C337	1-102-951-00	CERAMIC	15PF	5%	50V
C338	1-101-004-00	CERAMIC	0.01MF		50V
C339	1-101-004-00	CERAMIC	0.01MF		50V

<DIODE>

REF.NO.	PART NO.	DESCRIPTION	REMARK
D001	8-719-911-19	DIODE 1SS119	
D002	8-719-911-19	DIODE 1SS119	
D007	8-719-109-72	DIODE RD3.9ES-B2	
D101	8-719-110-41	DIODE RD15ES-B2	
D102	8-719-911-19	DIODE 1SS119	
D103	8-719-911-19	DIODE 1SS119	
D104	8-719-911-19	DIODE 1SS119	
D106	8-719-911-19	DIODE 1SS119	
D107	8-719-109-89	DIODE RD5.6ES-B2	
D108	8-719-109-89	DIODE RD5.6ES-B2	
D201	8-719-110-41	DIODE RD15ES-B2	
D202	8-719-911-19	DIODE 1SS119	
D203	8-719-911-19	DIODE 1SS119	
D204	8-719-911-19	DIODE 1SS119	
D206	8-719-911-19	DIODE 1SS119	
D207	8-719-109-89	DIODE RD5.6ES-B2	
D208	8-719-109-89	DIODE RD5.6ES-B2	
D301	8-719-110-41	DIODE RD15ES-B2	
D302	8-719-911-19	DIODE 1SS119	
D303	8-719-911-19	DIODE 1SS119	
D304	8-719-911-19	DIODE 1SS119	
D306	8-719-911-19	DIODE 1SS119	
D307	8-719-109-89	DIODE RD5.6ES-B2	
D308	8-719-109-89	DIODE RD5.6ES-B2	

<IC>

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC001	8-759-400-29	IC AN78L04	
IC002	8-759-982-46	IC RC79L08A	
IC101	8-741-131-30	IC BX-1313	
IC102	8-759-800-81	IC LA7016	
IC103	8-741-131-50	IC BX-1315	
IC104	8-769-401-89	TRANSISTOR TX-429M	
IC105	8-741-131-40	IC BX-1314	
IC106	8-741-131-30	IC BX-1313	
IC107	8-741-131-30	IC BX-1313	
IC201	8-741-131-30	IC BX-1313	
IC202	8-759-800-81	IC LA7016	
IC203	8-741-131-50	IC BX-1315	
IC204	8-769-401-89	TRANSISTOR TX-429M	
IC205	8-741-131-40	IC BX-1314	
IC206	8-741-131-30	IC BX-1313	
IC207	8-741-131-30	IC BX-1313	
IC301	8-741-131-30	IC BX-1313	
IC302	8-759-800-81	IC LA7016	
IC303	8-741-131-50	IC BX-1315	
IC304	8-769-401-89	TRANSISTOR TX-429M	
IC305	8-741-131-40	IC BX-1314	
IC306	8-741-131-30	IC BX-1313	
IC307	8-741-131-30	IC BX-1313	

<COIL>

REF.NO.	PART NO.	DESCRIPTION		REMARK
L102	1-408-421-00	INDUCTOR	100UH	
L103	1-408-421-00	INDUCTOR	100UH	
L202	1-408-421-00	INDUCTOR	100UH	
L203	1-408-421-00	INDUCTOR	100UH	
L302	1-408-421-00	INDUCTOR	100UH	
L303	1-408-421-00	INDUCTOR	100UH	

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q101	8-729-105-88	TRANSISTOR 2SC2570A	
Q102	8-729-105-88	TRANSISTOR 2SC2570A	
Q103	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q104	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q105	8-729-105-88	TRANSISTOR 2SC2570A	
Q106	8-729-802-45	TRANSISTOR 2SK125-5	
Q107	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q108	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q201	8-729-105-88	TRANSISTOR 2SC2570A	
Q202	8-729-105-88	TRANSISTOR 2SC2570A	
Q203	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q204	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q205	8-729-105-88	TRANSISTOR 2SC2570A	
Q206	8-729-802-45	TRANSISTOR 2SK125-5	
Q207	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q208	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q301	8-729-105-88	TRANSISTOR 2SC2570A	
Q302	8-729-105-88	TRANSISTOR 2SC2570A	
Q303	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q304	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q305	8-729-105-88	TRANSISTOR 2SC2570A	
Q306	8-729-802-45	TRANSISTOR 2SK125-5	
Q307	8-729-119-76	TRANSISTOR 2SA1175-HFE	

REF.NO.	PART NO.	DESCRIPTION				REMARK
Q308	8-729-119-76	TRANSISTOR 2SA1175-HFE				
		<RESISTOR>				
R013	1-247-903-00	CARBON	1M	5%	1/4W	
R101	1-249-405-11	CARBON	100	5%	1/4W	
R102	1-249-433-11	CARBON	22K	5%	1/4W	
R103	1-215-413-00	METAL	470	1%	1/6W	
R104	1-215-429-00	METAL	2.2K	1%	1/6W	
R105	1-215-429-00	METAL	2.2K	1%	1/6W	
R106	1-249-405-11	CARBON	100	5%	1/4W	
R107	1-215-415-00	METAL	560	1%	1/6W	
R108	1-249-405-11	CARBON	100	5%	1/4W	
R109	1-215-411-00	METAL	390	1%	1/6W	
R110	1-249-405-11	CARBON	100	5%	1/4W	
R111	1-215-411-00	METAL	390	1%	1/6W	
R112	1-249-405-11	CARBON	100	5%	1/4W	
R113	1-249-421-11	CARBON	2.2K	5%	1/4W	
R116	1-249-417-11	CARBON	1K	5%	1/4W	
R117	1-247-846-11	CARBON	4.3K	5%	1/4W	
R118	1-249-435-11	CARBON	33K	5%	1/4W	
R122	1-249-405-11	CARBON	100	5%	1/4W	
R123	1-249-429-11	CARBON	10K	5%	1/4W	
R124	1-247-903-00	CARBON	1M	5%	1/4W	
R125	1-249-405-11	CARBON	100	5%	1/4W	
R126	1-215-419-00	METAL	820	1%	1/6W	
R127	1-215-409-00	METAL	330	1%	1/6W	
R128	1-215-429-00	METAL	2.2K	1%	1/6W	
R129	1-215-429-00	METAL	2.2K	1%	1/6W	
R131	1-215-445-00	METAL	10K	1%	1/6W	
R132	1-215-409-00	METAL	330	1%	1/6W	
R133	1-215-423-00	METAL	1.2K	1%	1/6W	
R134	1-215-445-00	METAL	10K	1%	1/6W	
R135	1-215-428-00	METAL	2K	1%	1/6W	
R136	1-215-445-00	METAL	10K	1%	1/6W	
R139	1-215-421-00	METAL	1K	1%	1/6W	
R140	1-215-441-00	METAL	6.8K	1%	1/6W	
R141	1-214-702-00	METAL	75	1%	1/4W	
R142	1-249-399-11	CARBON	33	5%	1/4W	
R144	1-249-429-11	CARBON	10K	5%	1/4W	
R145	1-249-393-11	CARBON	10	5%	1/4W	
R146	1-247-903-00	CARBON	1M	5%	1/4W	
R148	1-249-405-11	CARBON	100	5%	1/4W	
R149	1-249-441-11	CARBON	100K	5%	1/4W	
R201	1-249-405-11	CARBON	100	5%	1/4W	
R202	1-249-433-11	CARBON	22K	5%	1/4W	
R203	1-215-413-00	METAL	470	1%	1/6W	
R204	1-215-429-00	METAL	2.2K	1%	1/6W	
R205	1-215-429-00	METAL	2.2K	1%	1/6W	
R206	1-249-405-11	CARBON	100	5%	1/4W	
R207	1-215-415-00	METAL	560	1%	1/6W	
R208	1-249-405-11	CARBON	100	5%	1/4W	
R209	1-215-411-00	METAL	390	1%	1/6W	
R210	1-249-405-11	CARBON	100	5%	1/4W	
R211	1-215-411-00	METAL	390	1%	1/6W	
R212	1-249-405-11	CARBON	100	5%	1/4W	
R213	1-249-421-11	CARBON	2.2K	5%	1/4W	
R216	1-249-417-11	CARBON	1K	5%	1/4W	
R217	1-247-846-11	CARBON	4.3K	5%	1/4W	
R218	1-249-435-11	CARBON	33K	5%	1/4W	
R222	1-249-405-11	CARBON	100	5%	1/4W	
R223	1-249-429-11	CARBON	10K	5%	1/4W	
R224	1-247-903-00	CARBON	1M	5%	1/4W	
R225	1-249-405-11	CARBON	100	5%	1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R226	1-215-419-00	METAL	820	1%	1/6W	
R227	1-215-409-00	METAL	330	1%	1/6W	
R228	1-215-429-00	METAL	2.2K	1%	1/6W	
R229	1-215-429-00	METAL	2.2K	1%	1/6W	
R231	1-215-445-00	METAL	10K	1%	1/6W	
R232	1-215-409-00	METAL	330	1%	1/6W	
R233	1-215-423-00	METAL	1.2K	1%	1/6W	
R234	1-215-445-00	METAL	10K	1%	1/6W	
R235	1-215-428-00	METAL	2K	1%	1/6W	
R236	1-215-445-00	METAL	10K	1%	1/6W	
R239	1-215-421-00	METAL	1K	1%	1/6W	
R240	1-215-441-00	METAL	6.8K	1%	1/6W	
R241	1-214-702-00	METAL	75	1%	1/4W	
R242	1-249-399-11	CARBON	33	5%	1/4W	
R244	1-249-429-11	CARBON	10K	5%	1/4W	
R245	1-249-393-11	CARBON	10	5%	1/4W	
R246	1-247-903-00	CARBON	1M	5%	1/4W	
R248	1-249-405-11	CARBON	100	5%	1/4W	
R249	1-249-441-11	CARBON	100K	5%	1/4W	
R301	1-249-405-11	CARBON	100	5%	1/4W	
R302	1-249-433-11	CARBON	22K	5%	1/4W	
R303	1-215-413-00	METAL	470	1%	1/6W	
R304	1-215-429-00	METAL	2.2K	1%	1/6W	
R305	1-215-429-00	METAL	2.2K	1%	1/6W	
R306	1-249-405-11	CARBON	100	5%	1/4W	
R307	1-215-415-00	METAL	560	1%	1/6W	
R308	1-249-405-11	CARBON	100	5%	1/4W	
R309	1-215-411-00	METAL	390	1%	1/6W	
R310	1-249-405-11	CARBON	100	5%	1/4W	
R311	1-215-411-00	METAL	390	1%	1/6W	
R312	1-249-405-11	CARBON	100	5%	1/4W	
R313	1-249-421-11	CARBON	2.2K	5%	1/4W	
R316	1-249-417-11	CARBON	1K	5%	1/4W	
R317	1-247-846-11	CARBON	4.3K	5%	1/4W	
R318	1-249-435-11	CARBON	33K	5%	1/4W	
R322	1-249-405-11	CARBON	100	5%	1/4W	
R323	1-249-429-11	CARBON	10K	5%	1/4W	
R324	1-247-903-00	CARBON	1M	5%	1/4W	
R325	1-249-405-11	CARBON	100	5%	1/4W	
R326	1-215-419-00	METAL	820	1%	1/6W	
R327	1-215-409-00	METAL	330	1%	1/6W	
R328	1-215-429-00	METAL	2.2K	1%	1/6W	
R329	1-215-429-00	METAL	2.2K	1%	1/6W	
R331	1-215-445-00	METAL	10K	1%	1/6W	
R332	1-215-409-00	METAL	330	1%	1/6W	
R333	1-215-423-00	METAL	1.2K	1%	1/6W	
R334	1-215-445-00	METAL	10K	1%	1/6W	
R335	1-215-428-00	METAL	2K	1%	1/6W	
R336	1-215-445-00	METAL	10K	1%	1/6W	
R339	1-215-421-00	METAL	1K	1%	1/6W	
R340	1-215-441-00	METAL	6.8K	1%	1/6W	
R341	1-214-702-00	METAL	75	1%	1/4W	
R342	1-249-399-11	CARBON	33	5%	1/4W	
R344	1-249-429-11	CARBON	10K	5%	1/4W	
R345	1-249-393-11	CARBON	10	5%	1/4W	
R346	1-247-903-00	CARBON	1M	5%	1/4W	
R348	1-249-405-11	CARBON	100	5%	1/4W	
R349	1-249-441-11	CARBON	100K	5%	1/4W	

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*A-1296-450-A BB BOARD, COMPLETE

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BB

REF.NO.	PART NO.	DESCRIPTION			REMARK
	*4-353-708-00	HOOK, FINGER			

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION
BB1	*1-562-729-11	CONNECTOR, MULTI 64P
	4-378-915-01	NUT (M2.6), PLATE; BB1

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION			REMARK
C1	1-101-004-00	CERAMIC	0.01MF		50V
C2	1-124-791-11	ELECT	1MF	20%	50V
C3	1-101-888-00	CERAMIC	68PF	5%	50V
C4	1-123-330-00	ELECT	22MF	20%	25V
C5	1-101-004-00	CERAMIC	0.01MF		50V
C6	1-124-791-11	ELECT	1MF	20%	50V
C7	1-101-004-00	CERAMIC	0.01MF		50V
C8	1-124-791-11	ELECT	1MF	20%	50V
C9	1-102-972-00	CERAMIC	91PF	5%	50V
C10	1-101-004-00	CERAMIC	0.01MF		50V
C11	1-101-004-00	CERAMIC	0.01MF		50V
C12	1-102-944-00	CERAMIC	7PF	1PF	50V
C13	1-123-330-00	ELECT	22MF	20%	25V
C14	1-101-004-00	CERAMIC	0.01MF		50V
C15	1-101-004-00	CERAMIC	0.01MF		50V
C16	1-101-888-00	CERAMIC	68PF	5%	50V
C17	1-123-330-00	ELECT	22MF	20%	25V
C18	1-101-004-00	CERAMIC	0.01MF		50V
C19	1-101-004-00	CERAMIC	0.01MF		50V
C20	1-102-972-00	CERAMIC	91PF	5%	50V
C21	1-102-944-00	CERAMIC	7PF	1PF	50V
C22	1-123-330-00	ELECT	22MF	20%	25V
C23	1-101-004-00	CERAMIC	0.01MF		50V
C24	1-101-888-00	CERAMIC	68PF	5%	50V
C25	1-123-330-00	ELECT	22MF	20%	25V
C26	1-101-004-00	CERAMIC	0.01MF		50V
C27	1-101-004-00	CERAMIC	0.01MF		50V
C28	1-102-972-00	CERAMIC	91PF	5%	50V
C29	1-102-944-00	CERAMIC	7PF	1PF	50V
C30	1-123-330-00	ELECT	22MF	20%	25V
C31	1-102-935-00	CERAMIC	2PF	0.25PF	50V
C32	1-101-888-00	CERAMIC	68PF	5%	50V
C33	1-123-330-00	ELECT	22MF	20%	25V
C34	1-124-277-11	ELECT	4.7MF	20%	35V
C35	1-126-101-11	ELECT	100MF	20%	16V
C36	1-123-330-00	ELECT	22MF	20%	25V
C37	1-124-126-00	ELECT	47MF	20%	16V
C38	1-123-321-00	ELECT	220MF	20%	16V
C39	1-101-004-00	CERAMIC	0.01MF		50V
C40	1-124-126-00	ELECT	47MF	20%	16V
C41	1-101-004-00	CERAMIC	0.01MF		50V
C42	1-124-126-00	ELECT	47MF	20%	16V
C43	1-123-330-00	ELECT	22MF	20%	25V
C44	1-101-004-00	CERAMIC	0.01MF		50V
C45	1-124-126-00	ELECT	47MF	20%	16V
C46	1-123-321-00	ELECT	220MF	20%	16V
C47	1-101-004-00	CERAMIC	0.01MF		50V
C48	1-124-126-00	ELECT	47MF	20%	16V
C49	1-124-126-00	ELECT	47MF	20%	16V
C50	1-101-004-00	CERAMIC	0.01MF		50V
C51	1-124-126-00	ELECT	47MF	20%	16V
C52	1-123-330-00	ELECT	22MF	20%	25V
C53	1-101-004-00	CERAMIC	0.01MF		50V
C54	1-124-126-00	ELECT	47MF	20%	16V
C55	1-101-004-00	CERAMIC	0.01MF		50V
C56	1-123-330-00	ELECT	22MF	20%	25V
C57	1-123-330-00	ELECT	22MF	20%	25V
C58	1-123-330-00	ELECT	22MF	20%	25V
C59	1-123-330-00	ELECT	22MF	20%	25V
C60	1-123-330-00	ELECT	22MF	20%	25V
C61	1-123-330-00	ELECT	22MF	20%	25V
C62	1-123-330-00	ELECT	22MF	20%	25V
C63	1-123-330-00	ELECT	22MF	20%	25V
C64	1-123-330-00	ELECT	22MF	20%	25V
C65	1-123-330-00	ELECT	22MF	20%	25V
C66	1-123-330-00	ELECT	22MF	20%	25V
C67	1-123-330-00	ELECT	22MF	20%	25V
C68	1-123-330-00	ELECT	22MF	20%	25V
C69	1-123-330-00	ELECT	22MF	20%	25V
C70	1-123-330-00	ELECT	22MF	20%	25V
C71	1-123-330-00	ELECT	22MF	20%	25V
C72	1-123-330-00	ELECT	22MF	20%	25V
C73	1-123-330-00	ELECT	22MF	20%	25V
C74	1-123-330-00	ELECT	22MF	20%	25V
C75	1-123-330-00	ELECT	22MF	20%	25V
C76	1-101-004-00	CERAMIC	0.01MF		50V
C77	1-101-004-00	CERAMIC	0.01MF		50V
C78	1-101-004-00	CERAMIC	0.01MF		50V
C79	1-101-004-00	CERAMIC	0.01MF		50V
C80	1-101-004-00	CERAMIC	0.01MF		50V
C81	1-101-004-00	CERAMIC	0.01MF		50V
C82	1-101-004-00	CERAMIC	0.01MF		50V
C83	1-101-004-00	CERAMIC	0.01MF		50V
C84	1-101-004-00	CERAMIC	0.01MF		50V
C85	1-101-004-00	CERAMIC	0.01MF		50V
C86	1-101-004-00	CERAMIC	0.01MF		50V
C87	1-101-004-00	CERAMIC	0.01MF		50V
C88	1-101-004-00	CERAMIC	0.01MF		50V
C89	1-101-004-00	CERAMIC	0.01MF		50V
C90	1-101-004-00	CERAMIC	0.01MF		50V
C91	1-124-282-00	ELECT	22MF	20%	16V
C92	1-124-282-00	ELECT	22MF	20%	16V
C93	1-124-282-00	ELECT	22MF	20%	16V
C94	1-124-282-00	ELECT	22MF	20%	16V
C95	1-124-282-00	ELECT	22MF	20%	16V
C96	1-124-282-00	ELECT	22MF	20%	16V
C97	1-124-282-00	ELECT	22MF	20%	16V
C98	1-124-282-00	ELECT	22MF	20%	16V
C99	1-124-282-00	ELECT	22MF	20%	16V

<DIODE>

REF.NO.	PART NO.	DESCRIPTION	
D1	8-719-911-19	DIODE	1SS119
D2	8-719-911-19	DIODE	1SS119
D3	8-719-911-19	DIODE	1SS119
D4	8-719-110-41	DIODE	RD15ES-B2
D5	8-719-911-19	DIODE	1SS119
D6	8-719-109-93	DIODE	RD6.2ES-B2
D7	8-719-110-41	DIODE	RD15ES-B2
D8	8-719-911-19	DIODE	1SS119
D9	8-719-110-41	DIODE	RD15ES-B2
D10	8-719-110-13	DIODE	RD9.1ES-B2
D11	8-719-110-41	DIODE	RD15ES-B2
D12	8-719-109-93	DIODE	RD6.2ES-B2
D13	8-719-911-19	DIODE	1SS119
D14	8-719-110-13	DIODE	RD9.1ES-B2
D15	8-719-109-93	DIODE	RD6.2ES-B2
D16	8-719-911-19	DIODE	1SS119

REF.NO.	PART NO.	DESCRIPTION	REMARK
D17	8-719-110-13	DIODE RD9.1ES-B2	
D18	8-719-911-19	DIODE 1SS119	
D19	8-719-110-13	DIODE RD9.1ES-B2	
D20	8-719-911-19	DIODE 1SS119	
D21	8-719-109-81	DIODE RD4.7ES-B2	
D22	8-719-110-17	DIODE RD10ES-B2	
D23	8-719-110-22	DIODE RD11ES-B2	
D24	8-719-109-89	DIODE RD5.6ES-B2	
D25	8-719-110-13	DIODE RD9.1ES-B2	
D26	8-719-110-17	DIODE RD10ES-B2	
		<DELAY LINE>	
DL1	1-415-466-11	DELAY LINE	
DL2	1-415-466-11	DELAY LINE	
DL3	1-415-466-11	DELAY LINE	
DL4	1-415-465-11	DELAY LINE	
DL5	1-415-465-11	DELAY LINE	
DL6	1-415-464-11	DELAY LINE	
		<IC>	
IC1	8-759-800-81	IC LA7016	
IC2	8-759-800-81	IC LA7016	
IC3	8-759-800-81	IC LA7016	
IC4	8-741-119-00	IC BX-1190	
IC5	8-741-119-00	IC BX-1190	
IC6	8-759-800-81	IC LA7016	
IC7	8-759-800-81	IC LA7016	
IC8	8-759-800-81	IC LA7016	
IC9	8-759-800-81	IC LA7016	
IC10	8-759-800-81	IC LA7016	
IC11	8-759-800-81	IC LA7016	
		<JACK>	
J1	1-560-914-00	POST, CONNECTOR 2P	
J1	*1-561-724-00	SOCKET, CONNECTOR 2P	
J2	1-560-914-00	POST, CONNECTOR 2P	
J2	*1-561-724-00	SOCKET, CONNECTOR 2P	
		<TRANSISTOR>	
Q1	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q2	8-729-105-88	TRANSISTOR 2SC2570A	
Q3	8-729-105-88	TRANSISTOR 2SC2570A	
Q4	8-729-105-88	TRANSISTOR 2SC2570A	
Q5	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q6	8-729-105-88	TRANSISTOR 2SC2570A	
Q7	8-729-105-88	TRANSISTOR 2SC2570A	
Q8	8-729-105-88	TRANSISTOR 2SC2570A	
Q9	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q10	8-729-105-88	TRANSISTOR 2SC2570A	
Q11	8-729-105-88	TRANSISTOR 2SC2570A	
Q12	8-729-105-88	TRANSISTOR 2SC2570A	
Q13	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q14	8-729-105-88	TRANSISTOR 2SC2570A	
Q15	8-729-105-88	TRANSISTOR 2SC2570A	
Q16	8-729-105-88	TRANSISTOR 2SC2570A	
Q17	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q18	8-729-105-88	TRANSISTOR 2SC2570A	
Q19	8-729-105-88	TRANSISTOR 2SC2570A	
Q20	8-729-105-88	TRANSISTOR 2SC2570A	
Q21	8-729-103-19	TRANSISTOR 2SA1206-K1	

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q22	8-729-105-88	TRANSISTOR 2SC2570A	
Q23	8-729-105-88	TRANSISTOR 2SC2570A	
Q24	8-729-105-88	TRANSISTOR 2SC2570A	
Q25	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q26	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q27	8-729-105-88	TRANSISTOR 2SC2570A	
Q28	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q29	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q30	8-729-105-88	TRANSISTOR 2SC2570A	
Q31	8-729-105-88	TRANSISTOR 2SC2570A	
Q32	8-729-105-88	TRANSISTOR 2SC2570A	
Q33	8-729-105-88	TRANSISTOR 2SC2570A	
Q34	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q35	8-729-105-88	TRANSISTOR 2SC2570A	
Q36	8-729-105-88	TRANSISTOR 2SC2570A	
Q37	8-729-378-84	TRANSISTOR 2SD788-5	
Q38	8-729-378-84	TRANSISTOR 2SD788-5	
Q39	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q40	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q41	8-729-600-82	TRANSISTOR 2SA1282-F	
Q42	8-729-600-82	TRANSISTOR 2SA1282-F	
Q43	8-729-119-76	TRANSISTOR 2SA1175-HFE	
		<RESISTOR>	
R1	1-249-435-11	CARBON 33K 5% 1/4W	
R2	1-249-429-11	CARBON 10K 5% 1/4W	
R3	1-249-405-11	CARBON 100 5% 1/4W	
R4	1-249-405-11	CARBON 100 5% 1/4W	
R5	1-249-427-11	CARBON 6.8K 5% 1/4W	
R6	1-249-405-11	CARBON 100 5% 1/4W	
R7	1-249-405-11	CARBON 100 5% 1/4W	
R8	1-249-435-11	CARBON 33K 5% 1/4W	
R9	1-249-423-11	CARBON 3.3K 5% 1/4W	
R10	1-249-405-11	CARBON 100 5% 1/4W	
R11	1-249-405-11	CARBON 100 5% 1/4W	
R12	1-249-405-11	CARBON 100 5% 1/4W	
R13	1-249-421-11	CARBON 2.2K 5% 1/4W	
R14	1-215-421-00	METAL 1K 1% 1/6W	
R15	1-249-405-11	CARBON 100 5% 1/4W	
R16	1-215-439-00	METAL 5.6K 1% 1/6W	
R17	1-215-459-00	METAL 39K 1% 1/6W	
R18	1-215-421-00	METAL 1K 1% 1/6W	
R19	1-249-437-11	CARBON 47K 5% 1/4W	
R20	1-215-413-00	METAL 470 1% 1/6W	
R21	1-215-384-00	METAL 30 1% 1/6W	
R22	1-215-407-00	METAL 270 1% 1/6W	
R25	1-215-429-00	METAL 2.2K 1% 1/6W	
R26	1-215-443-00	METAL 8.2K 1% 1/6W	
R27	1-249-405-11	CARBON 100 5% 1/4W	
R28	1-215-413-00	METAL 470 1% 1/6W	
R29	1-249-417-11	CARBON 1K 5% 1/4W	
R30	1-249-405-11	CARBON 100 5% 1/4W	
R31	1-249-421-11	CARBON 2.2K 5% 1/4W	
R32	1-249-405-11	CARBON 100 5% 1/4W	
R33	1-249-405-11	CARBON 100 5% 1/4W	
R34	1-249-427-11	CARBON 6.8K 5% 1/4W	
R35	1-249-405-11	CARBON 100 5% 1/4W	
R36	1-249-435-11	CARBON 33K 5% 1/4W	
R37	1-249-405-11	CARBON 100 5% 1/4W	
R38	1-215-429-00	METAL 2.2K 1% 1/6W	
R39	1-249-405-11	CARBON 100 5% 1/4W	
R40	1-249-405-11	CARBON 100 5% 1/4W	
R41	1-249-405-11	CARBON 100 5% 1/4W	

BB

REF.NO.	PART NO.	DESCRIPTION			REMARK
R42	1-249-418-11	CARBON	1.2K	5%	1/4W	
R43	1-215-397-00	METAL	100	1%	1/6W	
R44	1-215-397-00	METAL	100	1%	1/6W	
R45	1-249-405-11	CARBON	100	5%	1/4W	
R46	1-249-405-11	CARBON	100	5%	1/4W	
R47	1-249-427-11	CARBON	6.8K	5%	1/4W	
R48	1-249-405-11	CARBON	100	5%	1/4W	
R49	1-249-435-11	CARBON	33K	5%	1/4W	
R50	1-249-431-11	CARBON	15K	5%	1/4W	
R51	1-215-405-00	METAL	220	1%	1/6W	
R52	1-215-411-00	METAL	390	1%	1/6W	
R53	1-215-429-00	METAL	2.2K	1%	1/6W	
R55	1-249-405-11	CARBON	100	5%	1/4W	
R56	1-215-415-00	METAL	560	1%	1/6W	
R57	1-249-405-11	CARBON	100	5%	1/4W	
R58	1-249-405-11	CARBON	100	5%	1/4W	
R59	1-249-421-11	CARBON	2.2K	5%	1/4W	
R60	1-215-393-00	METAL	68	1%	1/6W	
R61	1-249-429-11	CARBON	10K	5%	1/4W	
R62	1-249-405-11	CARBON	100	5%	1/4W	
R63	1-215-394-00	METAL	75	1%	1/6W	
R64	1-249-405-11	CARBON	100	5%	1/4W	
R65	1-249-427-11	CARBON	6.8K	5%	1/4W	
R66	1-249-405-11	CARBON	100	5%	1/4W	
R67	1-249-435-11	CARBON	33K	5%	1/4W	
R68	1-249-405-11	CARBON	100	5%	1/4W	
R69	1-249-423-11	CARBON	3.3K	5%	1/4W	
R70	1-249-405-11	CARBON	100	5%	1/4W	
R71	1-249-405-11	CARBON	100	5%	1/4W	
R72	1-249-405-11	CARBON	100	5%	1/4W	
R73	1-249-421-11	CARBON	2.2K	5%	1/4W	
R74	1-249-437-11	CARBON	47K	5%	1/4W	
R75	1-215-413-00	METAL	470	1%	1/6W	
R76	1-215-393-00	METAL	68	1%	1/6W	
R77	1-215-420-00	METAL	910	1%	1/6W	
R78	1-215-391-00	METAL	56	1%	1/6W	
R79	1-215-428-00	METAL	2K	1%	1/6W	
R80	1-215-429-00	METAL	2.2K	1%	1/6W	
R81	1-215-443-00	METAL	8.2K	1%	1/6W	
R82	1-249-405-11	CARBON	100	5%	1/4W	
R83	1-215-413-00	METAL	470	1%	1/6W	
R84	1-249-417-11	CARBON	1K	5%	1/4W	
R85	1-249-405-11	CARBON	100	5%	1/4W	
R86	1-249-421-11	CARBON	2.2K	5%	1/4W	
R87	1-249-405-11	CARBON	100	5%	1/4W	
R88	1-249-405-11	CARBON	100	5%	1/4W	
R89	1-249-405-11	CARBON	100	5%	1/4W	
R90	1-249-405-11	CARBON	100	5%	1/4W	
R91	1-215-429-00	METAL	2.2K	1%	1/6W	
R92	1-249-405-11	CARBON	100	5%	1/4W	
R93	1-249-405-11	CARBON	100	5%	1/4W	
R94	1-249-405-11	CARBON	100	5%	1/4W	
R95	1-249-418-11	CARBON	1.2K	5%	1/4W	
R96	1-215-397-00	METAL	100	1%	1/6W	
R97	1-215-397-00	METAL	100	1%	1/6W	
R98	1-249-405-11	CARBON	100	5%	1/4W	
R99	1-249-405-11	CARBON	100	5%	1/4W	
R100	1-249-405-11	CARBON	100	5%	1/4W	
R101	1-249-431-11	CARBON	15K	5%	1/4W	
R102	1-215-405-00	METAL	220	1%	1/6W	
R103	1-215-411-00	METAL	390	1%	1/6W	
R104	1-215-429-00	METAL	2.2K	1%	1/6W	
R106	1-249-405-11	CARBON	100	5%	1/4W	
R107	1-215-415-00	METAL	560	1%	1/6W	
R108	1-249-405-11	CARBON	100	5%	1/4W	
R109	1-249-405-11	CARBON	100	5%	1/4W	
R110	1-249-421-11	CARBON	2.2K	5%	1/4W	
R111	1-215-393-00	METAL	68	1%	1/6W	
R112	1-249-429-11	CARBON	10K	5%	1/4W	
R113	1-249-405-11	CARBON	100	5%	1/4W	
R114	1-249-405-11	CARBON	100	5%	1/4W	
R115	1-249-405-11	CARBON	100	5%	1/4W	
R116	1-249-405-11	CARBON	100	5%	1/4W	
R117	1-249-423-11	CARBON	3.3K	5%	1/4W	
R118	1-249-405-11	CARBON	100	5%	1/4W	
R119	1-249-405-11	CARBON	100	5%	1/4W	
R120	1-249-405-11	CARBON	100	5%	1/4W	
R121	1-249-421-11	CARBON	2.2K	5%	1/4W	
R122	1-215-421-00	METAL	1K	1%	1/6W	
R123	1-249-405-11	CARBON	100	5%	1/4W	
R124	1-215-439-00	METAL	5.6K	1%	1/6W	
R125	1-215-459-00	METAL	39K	1%	1/6W	
R126	1-215-421-00	METAL	1K	1%	1/6W	
R127	1-249-437-11	CARBON	47K	5%	1/4W	
R128	1-215-413-00	METAL	470	1%	1/6W	
R131	1-215-379-00	METAL	18	1%	1/6W	
R132	1-215-406-00	METAL	240	1%	1/6W	
R133	1-215-429-00	METAL	2.2K	1%	1/6W	
R134	1-215-443-00	METAL	8.2K	1%	1/6W	
R135	1-249-405-11	CARBON	100	5%	1/4W	
R136	1-215-413-00	METAL	470	1%	1/6W	
R137	1-249-417-11	CARBON	1K	5%	1/4W	
R138	1-249-405-11	CARBON	100	5%	1/4W	
R139	1-249-421-11	CARBON	2.2K	5%	1/4W	
R140	1-249-405-11	CARBON	100	5%	1/4W	
R141	1-249-405-11	CARBON	100	5%	1/4W	
R142	1-249-405-11	CARBON	100	5%	1/4W	
R143	1-249-405-11	CARBON	100	5%	1/4W	
R144	1-215-429-00	METAL	2.2K	1%	1/6W	
R145	1-249-405-11	CARBON	100	5%	1/4W	
R146	1-249-405-11	CARBON	100	5%	1/4W	
R147	1-249-405-11	CARBON	100	5%	1/4W	
R148	1-249-418-11	CARBON	1.2K	5%	1/4W	
R149	1-215-397-00	METAL	100	1%	1/6W	
R150	1-215-397-00	METAL	100	1%	1/6W	
R151	1-249-405-11	CARBON	100	5%	1/4W	
R152	1-249-405-11	CARBON	100	5%	1/4W	
R153	1-249-405-11	CARBON	100	5%	1/4W	
R154	1-249-431-11	CARBON	15K	5%	1/4W	
R155	1-215-405-00	METAL	220	1%	1/6W	
R156	1-215-411-00	METAL	390	1%	1/6W	
R157	1-215-429-00	METAL	2.2K	1%	1/6W	
R159	1-249-405-11	CARBON	100	5%	1/4W	
R160	1-215-415-00	METAL	560	1%	1/6W	
R161	1-249-405-11	CARBON	100	5%	1/4W	
R162	1-249-405-11	CARBON	100	5%	1/4W	
R163	1-249-421-11	CARBON	2.2K	5%	1/4W	
R164	1-215-393-00	METAL	68	1%	1/6W	
R165	1-215-405-00	METAL	220	1%	1/6W	
R166	1-215-429-00	METAL	2.2K	1%	1/6W	
R167	1-215-401-11	METAL	150	1%	1/6W	
R168	1-215-401-11	METAL	150	1%	1/6W	
R169	1-215-421-00	METAL	1K	1%	1/6W	
R170	1-215-429-00	METAL	2.2K	1%	1/6W	
R171	1-215-455-00	METAL	27K	1%	1/6W	
R172	1-215-415-00	METAL	560	1%	1/6W	
R173	1-215-429-00	METAL	2.2K	1%	1/6W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R174	1-249-405-11	CARBON	100	5%	1/4W	
R175	1-249-401-11	CARBON	47	5%	1/4W	
R176	1-249-426-11	CARBON	5.6K	5%	1/4W	
R177	1-249-411-11	CARBON	330	5%	1/4W	
R178	1-249-437-11	CARBON	47K	5%	1/4W	
R179	1-249-423-11	CARBON	3.3K	5%	1/4W	
R180	1-249-405-11	CARBON	100	5%	1/4W	
R181	1-249-405-11	CARBON	100	5%	1/4W	
R182	1-249-405-11	CARBON	100	5%	1/4W	
R183	1-249-421-11	CARBON	2.2K	5%	1/4W	
R184	1-249-405-11	CARBON	100	5%	1/4W	
R185	1-249-415-11	CARBON	680	5%	1/4W	
R186	1-249-405-11	CARBON	100	5%	1/4W	
R187	1-215-397-00	METAL	100	1%	1/6W	
R188	1-215-397-00	METAL	100	1%	1/6W	
R189	1-249-405-11	CARBON	100	5%	1/4W	
R190	1-249-423-11	CARBON	3.3K	5%	1/4W	
R191	1-249-405-11	CARBON	100	5%	1/4W	
R192	1-249-405-11	CARBON	100	5%	1/4W	
R193	1-249-405-11	CARBON	100	5%	1/4W	
R194	1-249-415-11	CARBON	680	5%	1/4W	
R195	1-215-397-00	METAL	100	1%	1/6W	
R196	1-215-397-00	METAL	100	1%	1/6W	
R197	1-249-405-11	CARBON	100	5%	1/4W	
R198	1-249-405-11	CARBON	100	5%	1/4W	
R199	1-249-421-11	CARBON	2.2K	5%	1/4W	
R200	1-215-428-00	METAL	2K	1%	1/6W	
R201	1-215-407-00	METAL	270	1%	1/6W	
R202	1-215-441-00	METAL	6.8K	1%	1/6W	
R203	1-215-437-00	METAL	4.7K	1%	1/6W	
R204	1-249-401-11	CARBON	47	5%	1/4W	
R205	1-215-403-00	METAL	180	1%	1/6W	
R206	1-215-409-00	METAL	330	1%	1/6W	
R207	1-215-435-00	METAL	3.9K	1%	1/6W	
R208	1-215-433-00	METAL	3.3K	1%	1/6W	
R209	1-249-405-11	CARBON	100	5%	1/4W	
R210	1-249-405-11	CARBON	100	5%	1/4W	
R211	1-215-429-00	METAL	2.2K	1%	1/6W	
R212	1-215-405-00	METAL	220	1%	1/6W	
R213	1-215-391-00	METAL	56	1%	1/6W	
R214	1-215-413-00	METAL	470	1%	1/6W	
R215	1-215-417-00	METAL	680	1%	1/6W	
R216	1-249-405-11	CARBON	100	5%	1/4W	
R217	1-249-405-11	CARBON	100	5%	1/4W	
R218	1-249-422-11	CARBON	2.7K	5%	1/4W	
R219	1-215-397-00	METAL	100	1%	1/6W	
R220	1-215-397-00	METAL	100	1%	1/6W	
R221	1-249-422-11	CARBON	2.7K	5%	1/4W	
R222	1-247-736-11	CARBON	56	5%	1/2W	
R223	1-249-417-11	CARBON	1K	5%	1/4W	
R224	1-249-438-11	CARBON	56K	5%	1/4W	
R225	1-249-426-11	CARBON	5.6K	5%	1/4W	
R226	1-249-437-11	CARBON	47K	5%	1/4W	
R227	1-249-417-11	CARBON	1K	5%	1/4W	
R228	1-247-731-11	CARBON	22	5%	1/2W	
R229	1-249-417-11	CARBON	1K	5%	1/4W	
R230	1-249-441-11	CARBON	100K	5%	1/4W	
R231	1-249-441-11	CARBON	100K	5%	1/4W	
R232	1-215-419-00	METAL	820	1%	1/6W	
R233	1-215-455-00	METAL	27K	1%	1/6W	
R236	1-215-415-00	METAL	560	1%	1/6W	
R237	1-215-432-00	METAL	3K	1%	1/6W	
R239	1-249-409-11	CARBON	220	5%	1/4W	
R240	1-249-438-11	CARBON	56K	5%	1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R241	1-249-438-11	CARBON	56K	5%	1/4W	
R242	1-249-438-11	CARBON	56K	5%	1/4W	
R243	1-249-438-11	CARBON	56K	5%	1/4W	
R244	1-249-438-11	CARBON	56K	5%	1/4W	
R245	1-249-438-11	CARBON	56K	5%	1/4W	
R246	1-249-438-11	CARBON	56K	5%	1/4W	
R247	1-249-438-11	CARBON	56K	5%	1/4W	
R248	1-249-438-11	CARBON	56K	5%	1/4W	
R249	1-249-409-11	CARBON	220	5%	1/4W	

<VARIABLE,RESISTOR>

RV1	1-237-512-21	RES, ADJ, CERMET 100
RV2	1-237-512-21	RES, ADJ, CERMET 100
RV3	1-237-512-21	RES, ADJ, CERMET 100
RV4	1-237-513-21	RES, ADJ, CERMET 200
RV5	1-237-512-21	RES, ADJ, CERMET 100
RV6	1-237-513-21	RES, ADJ, CERMET 200
RV7	1-237-513-21	RES, ADJ, CERMET 200
RV8	1-237-513-21	RES, ADJ, CERMET 200
RV9	1-237-512-21	RES, ADJ, CERMET 100
RV10	1-237-512-21	RES, ADJ, CERMET 100
RV11	1-237-512-21	RES, ADJ, CERMET 100

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*A-1296-451-A BE BOARD, COMPLETE
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*4-353-708-00 HOOK, FINGER
4-378-915-01 NUT (M2.6), PLATE

<CONNECTOR>

BE1 *1-562-729-11 CONNECTOR, MULTI 64P

<CAPACITOR>

C1	1-124-472-11	ELECT	470MF	20%	6.3V
C2	1-124-120-11	ELECT	220MF	20%	16V
C3	1-161-051-00	CERAMIC	0.01MF	10%	25V
C4	1-124-120-11	ELECT	220MF	20%	16V
C5	1-161-051-00	CERAMIC	0.01MF	10%	25V
C6	1-124-120-11	ELECT	220MF	20%	16V
C7	1-124-120-11	ELECT	220MF	20%	16V
C8	1-161-055-00	CERAMIC	0.022MF	10%	25V
C9	1-161-051-00	CERAMIC	0.01MF	10%	25V
C10	1-101-884-00	CERAMIC	56PF	5%	50V
C11	1-161-051-00	CERAMIC	0.01MF	10%	25V
C12	1-124-120-11	ELECT	220MF	20%	16V
C13	1-101-880-00	CERAMIC	47PF	5%	50V
C14	1-102-816-00	CERAMIC	120PF	5%	50V
C15	1-102-980-00	CERAMIC	270PF	5%	50V
C16	1-102-959-00	CERAMIC	22PF	5%	50V
C17	1-130-475-00	MYLAR	0.0022MF	5%	50V
C18	1-161-051-00	CERAMIC	0.01MF	10%	25V
C19	1-161-051-00	CERAMIC	0.01MF	10%	25V
C20	1-161-051-00	CERAMIC	0.01MF	10%	25V
C21	1-161-051-00	CERAMIC	0.01MF	10%	25V
C22	1-161-051-00	CERAMIC	0.01MF	10%	25V
C23	1-161-051-00	CERAMIC	0.01MF	10%	25V
C24	1-161-051-00	CERAMIC	0.01MF	10%	25V
C25	1-161-051-00	CERAMIC	0.01MF	10%	25V
C26	1-126-176-11	ELECT	220MF	20%	6.3V

REF.NO.	PART NO.	DESCRIPTION	REMARK
C27	1-161-051-00	CERAMIC 0.01MF 10% 25V	
C28	1-126-176-11	ELECT 220MF 20% 6.3V	
C29	1-161-051-00	CERAMIC 0.01MF 10% 25V	
C30	1-161-051-00	CERAMIC 0.01MF 10% 25V	
C31	1-136-165-00	FILM 0.1MF 5% 50V	
C32	1-136-165-00	FILM 0.1MF 5% 50V	
C34	1-124-791-11	ELECT 1MF 20% 50V	
C35	1-123-330-00	ELECT 22MF 20% 16V	
C36	1-126-101-11	ELECT 100MF 20% 16V	
C38	1-161-051-00	CERAMIC 0.01MF 10% 25V	
C39	1-161-051-00	CERAMIC 0.01MF 10% 25V	
C40	1-161-051-00	CERAMIC 0.01MF 10% 25V	
		<DIODE>	
D1	8-719-911-19	DIODE 1SS119	
D2	8-719-911-19	DIODE 1SS119	
D3	8-719-911-19	DIODE 1SS119	
D4	8-719-911-19	DIODE 1SS119	
D5	8-719-911-19	DIODE 1SS119	
D6	8-719-911-19	DIODE 1SS119	
D8	8-719-911-19	DIODE 1SS119	
D9	8-719-911-19	DIODE 1SS119	
		<IC>	
IC1	8-759-910-00	IC SN74S00N	
IC2	8-759-911-63	IC SN74S163N	
IC3	8-759-901-63	IC SN74LS163AN	
IC4	8-759-901-63	IC SN74LS163AN	
IC5	8-759-901-63	IC SN74LS163AN	
IC6	8-759-741-17	IC MB7138E-HSGH	
	*1-526-658-21	SOCKET, IC (DP) 24P; IC6	
IC7	8-759-913-74	IC SN74S374N	
IC8	8-759-901-63	IC SN74LS163AN	
IC9	8-759-901-63	IC SN74LS163AN	
IC10	8-759-901-63	IC SN74LS163AN	
IC11	8-759-741-18	IC MBM2764-VSGH	
	*1-526-659-00	SOCKET, IC (DP) 28P; IC11	
IC12	8-759-901-75	IC SN74LS175N	
IC13	8-759-901-75	IC SN74LS175N	
IC14	8-759-974-06	IC SN7406N	
IC15	8-759-737-17	IC MB7116H-K-PTD	
	*1-526-654-00	SOCKET, IC (DP) 16P; IC15	
IC16	8-759-901-37	IC SN74LS137N	
IC17	8-759-974-07	IC SN7407N	
IC18	8-759-901-61	IC SN74LS161AN	
IC19	8-759-988-75	IC MB7116H-K-COMPH	
	*1-526-654-00	SOCKET, IC (DP) 16P; IC19	
IC20	8-759-901-75	IC SN74LS175N	
IC21	8-759-910-00	IC SN74S00N	
IC22	8-759-982-25	IC RC78L09A	
IC23	8-759-900-08	IC SN74LS08N	
IC24	8-759-900-32	IC SN74LS32N	
IC25	8-759-900-00	IC SN74LS00N	
IC26	8-759-989-69	IC SN74LS86AN	
IC27	8-759-900-08	IC SN74LS08N	
		<COIL>	
L1	1-408-088-00	INDUCTOR 220UH	
L2	1-408-088-00	INDUCTOR 220UH	

REF.NO.	PART NO.	DESCRIPTION	REMARK
		<TRANSISTOR>	
Q1	8-729-313-82	TRANSISTOR 2SD1138-C	
Q2	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q3	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q4	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q5	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q6	8-729-300-13	TRANSISTOR 2SC2471	
Q7	8-729-110-53	TRANSISTOR 2SA1005-K	
Q8	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q9	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q10	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q11	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q12	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q13	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q14	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q15	8-729-119-78	TRANSISTOR 2SC2785-HFE	
		<RESISTOR>	
R1	1-249-414-11	CARBON 560 5% 1/4W	
R2	1-249-417-11	CARBON 1K 5% 1/4W	
R3	1-249-417-11	CARBON 1K 5% 1/4W	
R4	1-249-429-11	CARBON 10K 5% 1/4W	
R5	1-249-429-11	CARBON 10K 5% 1/4W	
R6	1-249-429-11	CARBON 10K 5% 1/4W	
R7	1-249-429-11	CARBON 10K 5% 1/4W	
R8	1-249-429-11	CARBON 10K 5% 1/4W	
R9	1-249-417-11	CARBON 1K 5% 1/4W	
R10	1-249-429-11	CARBON 10K 5% 1/4W	
R11	1-249-429-11	CARBON 10K 5% 1/4W	
R12	1-249-429-11	CARBON 10K 5% 1/4W	
R13	1-249-429-11	CARBON 10K 5% 1/4W	
R14	1-249-429-11	CARBON 10K 5% 1/4W	
R15	1-249-405-11	CARBON 100 5% 1/4W	
R16	1-215-378-00	METAL 16 1% 1/6W	
R17	1-215-378-00	METAL 16 1% 1/6W	
R18	1-215-383-00	METAL 27 1% 1/6W	
R19	1-249-429-11	CARBON 10K 5% 1/4W	
R20	1-249-429-11	CARBON 10K 5% 1/4W	
R21	1-215-391-00	METAL 56 1% 1/6W	
R22	1-215-377-00	METAL 15 1% 1/6W	
R23	1-215-377-00	METAL 15 1% 1/6W	
R24	1-247-848-11	CARBON 5.1K 5% 1/4W	
R25	1-215-437-00	METAL 4.7K 1% 1/6W	
R26	1-215-405-00	METAL 220 1% 1/6W	
R27	1-215-428-00	METAL 2K 1% 1/6W	
R28	1-249-388-11	CARBON 3.9 5% 1/4W	
R29	1-249-429-11	CARBON 10K 5% 1/4W	
R30	1-247-804-11	CARBON 75 5% 1/4W	
R31	1-249-429-11	CARBON 10K 5% 1/4W	
R32	1-249-388-11	CARBON 3.9 5% 1/4W	
R33	1-249-429-11	CARBON 10K 5% 1/4W	
R34	1-215-441-00	METAL 6.8K 1% 1/6W	
R35	1-249-429-11	CARBON 10K 5% 1/4W	
R36	1-247-804-11	CARBON 75 5% 1/4W	
R37	1-249-388-11	CARBON 3.9 5% 1/4W	
R38	1-249-388-11	CARBON 3.9 5% 1/4W	
R39	1-249-411-11	CARBON 330 5% 1/4W	
R40	1-249-411-11	CARBON 330 5% 1/4W	
R41	1-249-435-11	CARBON 33K 5% 1/4W	
R42	1-249-405-11	CARBON 100 5% 1/4W	
R44	1-215-399-00	METAL 120 1% 1/6W	
R45	1-215-431-00	METAL 2.7K 1% 1/6W	
R46	1-215-455-00	METAL 27K 1% 1/6W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R47	1-215-421-00	METAL	1K	1%	1/6W	
R48	1-215-441-00	METAL	6.8K	1%	1/6W	
R49	1-215-413-00	METAL	470	1%	1/6W	
R50	1-215-441-00	METAL	6.8K	1%	1/6W	
R51	1-215-421-00	METAL	1K	1%	1/6W	
R52	1-215-431-00	METAL	2.7K	1%	1/6W	
R53	1-215-415-00	METAL	560	1%	1/6W	
R54	1-215-433-00	METAL	3.3K	1%	1/6W	
R55	1-249-413-11	CARBON	470	5%	1/4W	
R56	1-215-427-00	METAL	1.8K	1%	1/6W	
R57	1-249-421-11	CARBON	2.2K	5%	1/4W	
R58	1-249-421-11	CARBON	2.2K	5%	1/4W	
R61	1-249-425-11	CARBON	4.7K	5%	1/4W	

<RESISTOR BLOCK>

REF.NO.	PART NO.	DESCRIPTION
RB1	1-231-407-00	RESISTOR BLOCK 2.2K
RB2	1-231-407-00	RESISTOR BLOCK 2.2K

<VARIABLE RESISTOR>

REF.NO.	PART NO.	DESCRIPTION
RV1	1-237-518-21	RES, ADJ, CERMET 10K

<CRYSTAL>

REF.NO.	PART NO.	DESCRIPTION
X1	1-527-819-11	VIBRATOR, CRYSTAL

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*A-1296-452-A BF BOARD, COMPLETE
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*4-353-708-00 HOOK, FINGER

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION
BF1	*1-562-729-11	CONNECTOR, MULTI 64P
	4-378-915-01	NUT (M2.6), PLATE; BF1

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
C001	1-124-478-11	ELECT	100MF	20%	25V	
C002	1-101-004-00	CERAMIC	0.01MF		50V	
C003	1-124-478-11	ELECT	100MF	20%	25V	
C004	1-101-004-00	CERAMIC	0.01MF		50V	
C005	1-124-478-11	ELECT	100MF	20%	25V	
C006	1-124-478-11	ELECT	100MF	20%	25V	
C007	1-124-478-11	ELECT	100MF	20%	25V	
C008	1-101-004-00	CERAMIC	0.01MF		50V	
C009	1-124-478-11	ELECT	100MF	20%	25V	
C010	1-101-004-00	CERAMIC	0.01MF		50V	
C011	1-124-478-11	ELECT	100MF	20%	25V	
C012	1-101-004-00	CERAMIC	0.01MF		50V	
C013	1-101-004-00	CERAMIC	0.01MF		50V	
C014	1-101-004-00	CERAMIC	0.01MF		50V	
C015	1-101-004-00	CERAMIC	0.01MF		50V	
C017	1-101-004-00	CERAMIC	0.01MF		50V	
C019	1-101-004-00	CERAMIC	0.01MF		50V	
C020	1-101-004-00	CERAMIC	0.01MF		50V	
C101	1-124-477-11	ELECT	47MF	20%	25V	
C102	1-124-791-11	ELECT	1MF	20%	50V	
C103	1-124-477-11	ELECT	47MF	20%	25V	
C104	1-102-824-00	CERAMIC	470PF	5%	50V	
C105	1-102-824-00	CERAMIC	470PF	5%	50V	
C106	1-124-477-11	ELECT	47MF	20%	25V	
C107	1-124-477-11	ELECT	47MF	20%	25V	
C108	1-101-004-00	CERAMIC	0.01MF		50V	
C109	1-124-120-11	ELECT	220MF	20%	25V	
C111	1-124-925-11	ELECT	2.2MF	20%	50V	
C112	1-126-233-11	ELECT	22MF	20%	25V	
C113	1-124-477-11	ELECT	47MF	20%	25V	
C115	1-124-477-11	ELECT	47MF	20%	25V	
C116	1-108-792-11	MYLAR	0.001MF	5%	50V	
C117	1-101-004-00	CERAMIC	0.01MF		50V	
C118	1-102-973-00	CERAMIC	100PF	5%	50V	
C119	1-101-004-00	CERAMIC	0.01MF		50V	
C120	1-124-477-11	ELECT	47MF	20%	25V	
C121	1-124-791-11	ELECT	1MF	20%	50V	
C122	1-102-978-00	CERAMIC	220PF	5%	50V	
C123	1-101-004-00	CERAMIC	0.01MF		50V	
C124	1-102-820-00	CERAMIC	330PF	5%	50V	
C125	1-101-004-00	CERAMIC	0.01MF		50V	
C126	1-101-880-00	CERAMIC	47PF	5%	50V	
C127	1-101-880-00	CERAMIC	47PF	5%	50V	
C128	1-124-006-11	ELECT	10MF	20%	25V	
C129	1-102-959-00	CERAMIC	22PF	5%	50V	
C130	1-102-973-00	CERAMIC	100PF	5%	50V	
C131	1-102-824-00	CERAMIC	470PF	5%	50V	
C132	1-102-824-00	CERAMIC	470PF	5%	50V	
C133	1-101-361-00	CERAMIC	150PF	5%	50V	
C134	1-102-973-00	CERAMIC	100PF	5%	50V	
C135	1-101-004-00	CERAMIC	0.01MF		50V	
C136	1-101-004-00	CERAMIC	0.01MF		50V	
C137	1-101-004-00	CERAMIC	0.01MF		50V	
C138	1-101-004-00	CERAMIC	0.01MF		50V	
C139	1-101-004-00	CERAMIC	0.01MF		50V	
C140	1-101-004-00	CERAMIC	0.01MF		50V	
C141	1-124-477-11	ELECT	47MF	20%	25V	
C142	1-136-173-00	FILM	0.47MF	5%	50V	
C201	1-102-820-00	CERAMIC	330PF	5%	50V	
C203	1-102-961-00	CERAMIC	27PF	5%	50V	
C204	1-102-973-00	CERAMIC	100PF	5%	50V	
C205	1-101-888-00	CERAMIC	68PF	5%	50V	
C206	1-102-973-00	CERAMIC	100PF	5%	50V	
C207	1-136-153-00	FILM	0.01MF	5%	50V	
C208	1-123-875-11	ELECT	10MF	20%	50V	
C209	1-101-004-00	CERAMIC	0.01MF		50V	
C210	1-101-004-00	CERAMIC	0.01MF		50V	
C211	1-101-004-00	CERAMIC	0.01MF		50V	
C212	1-101-004-00	CERAMIC	0.01MF		50V	
C213	1-101-004-00	CERAMIC	0.01MF		50V	
C214	1-101-004-00	CERAMIC	0.01MF		50V	
C215	1-124-477-11	ELECT	47MF	20%	25V	
C216	1-124-477-11	ELECT	47MF	20%	25V	
C221	1-102-980-00	CERAMIC	270PF	5%	50V	
C222	1-101-361-00	CERAMIC	150PF	5%	50V	
C301	1-102-820-00	CERAMIC	330PF	5%	50V	
C302	1-101-004-00	CERAMIC	0.01MF		50V	
C303	1-101-880-00	CERAMIC	47PF	5%	50V	
C304	1-101-880-00	CERAMIC	47PF	5%	50V	
C305	1-124-006-11	ELECT	10MF	20%	25V	
C306	1-124-277-11	ELECT	4.7MF	20%	35V	
C307	1-108-796-11	MYLAR	0.0022MF	5%	50V	
C308	1-108-796-11	MYLAR	0.0022MF	5%	50V	
C309	1-136-169-00	FILM	0.22MF	5%	50V	
C310	1-136-153-00	FILM	0.01MF	5%	50V	
C311	1-101-004-00	CERAMIC	0.01MF		50V	
C312	1-101-004-00	CERAMIC	0.01MF		50V	

BF

REF.NO.	PART NO.	DESCRIPTION	REMARK
C314	1-124-477-11	ELECT 47MF 20%	25V
C315	1-124-477-11	ELECT 47MF 20%	25V
C316	1-124-478-11	ELECT 100MF 20%	25V
C320	1-101-004-00	CERAMIC 0.01MF	50V
C351	1-101-001-00	CERAMIC 0.001MF	50V

<DIODE>

REF.NO.	PART NO.	DESCRIPTION
D002	8-719-911-19	DIODE 1SS119
D004	8-719-911-19	DIODE 1SS119
D005	8-719-911-19	DIODE 1SS119
D006	8-719-911-19	DIODE 1SS119
D007	8-719-911-19	DIODE 1SS119
D008	8-719-911-19	DIODE 1SS119
D009	8-719-911-19	DIODE 1SS119
D011	8-719-911-19	DIODE 1SS119
D101	8-719-911-19	DIODE 1SS119
D102	8-719-911-19	DIODE 1SS119
D103	8-719-911-19	DIODE 1SS119
D104	8-719-911-19	DIODE 1SS119
D105	8-719-911-19	DIODE 1SS119
D106	8-719-911-19	DIODE 1SS119
D107	8-719-911-19	DIODE 1SS119
D108	8-719-911-19	DIODE 1SS119
D110	8-719-109-89	DIODE RD5.6ES-B2
D111	8-719-109-89	DIODE RD5.6ES-B2
D112	8-719-109-89	DIODE RD5.6ES-B2
D202	8-719-911-19	DIODE 1SS119
D301	8-719-911-19	DIODE 1SS119
D302	8-719-911-19	DIODE 1SS119
D303	8-719-911-19	DIODE 1SS119
D304	8-719-911-19	DIODE 1SS119

<IC>

REF.NO.	PART NO.	DESCRIPTION
IC4	8-759-916-15	IC SN74HC05N
IC002	8-759-982-21	IC RC78L05A
IC101	8-759-240-53	IC TC4053BP
IC102	8-759-014-96	IC MC1496P
IC103	8-759-203-83	IC TC74HC4538P
IC104	8-759-203-83	IC TC74HC4538P
IC105	8-759-921-17	IC SN74HC153N
IC106	8-759-203-83	IC TC74HC4538P
IC201	8-759-921-09	IC SN74HC36N
IC202	8-759-000-99	IC MC74HC74N
IC203	8-759-203-83	IC TC74HC4538P
IC204	8-759-203-83	IC TC74HC4538P
IC205	8-759-921-17	IC SN74HC153N
IC206	8-759-203-83	IC TC74HC4538P
IC301	8-759-921-17	IC SN74HC153N
IC302	8-759-203-83	IC TC74HC4538P

<COIL>

REF.NO.	PART NO.	DESCRIPTION
L001	1-408-429-00	INDUCTOR 470UH
L002	1-408-429-00	INDUCTOR 470UH

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION
Q002	8-729-900-80	TRANSISTOR DTC114ES
Q101	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q102	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q103	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q104	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q105	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q106	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q108	8-729-103-19	TRANSISTOR 2SA1206-K1
Q109	8-729-105-88	TRANSISTOR 2SC2570A
Q110	8-729-105-88	TRANSISTOR 2SC2570A
Q111	8-729-697-92	TRANSISTOR 2SA979-G
Q112	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q113	8-729-119-76	TRANSISTOR 2SA1175-HFE
Q114	8-729-697-92	TRANSISTOR 2SA979-G
Q115	8-729-697-92	TRANSISTOR 2SA979-G
Q117	8-729-119-76	TRANSISTOR 2SA1175-HFE
Q118	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q119	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q120	8-729-119-76	TRANSISTOR 2SA1175-HFE
Q121	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q122	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q123	8-729-119-76	TRANSISTOR 2SA1175-HFE
Q124	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q125	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q126	8-729-119-76	TRANSISTOR 2SA1175-HFE
Q201	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q202	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q203	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q204	8-729-201-05	TRANSISTOR 2SC2878-B
Q301	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q302	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q303	8-729-119-76	TRANSISTOR 2SA1175-HFE
Q304	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q305	8-729-119-78	TRANSISTOR 2SC2785-HFE
Q306	8-729-119-76	TRANSISTOR 2SA1175-HFE
Q307	8-729-119-78	TRANSISTOR 2SC2785-HFE

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION
R001	1-249-441-11	CARBON 100K 5% 1/4W
R002	1-249-441-11	CARBON 100K 5% 1/4W
R003	1-249-441-11	CARBON 100K 5% 1/4W
R006	1-249-441-11	CARBON 100K 5% 1/4W
R008	1-249-417-11	CARBON 1K 5% 1/4W
R009	1-249-441-11	CARBON 100K 5% 1/4W
R010	1-249-437-11	CARBON 47K 5% 1/4W
R011	1-249-437-11	CARBON 47K 5% 1/4W
R012	1-249-437-11	CARBON 47K 5% 1/4W
R013	1-249-437-11	CARBON 47K 5% 1/4W
R015	1-249-437-11	CARBON 47K 5% 1/4W
R016	1-249-405-11	CARBON 100 5% 1/4W
R017	1-249-405-11	CARBON 100 5% 1/4W
R019	1-249-405-11	CARBON 100 5% 1/4W
R020	1-249-437-11	CARBON 47K 5% 1/4W
R021	1-249-437-11	CARBON 47K 5% 1/4W
R022	1-249-437-11	CARBON 47K 5% 1/4W
R023	1-249-437-11	CARBON 47K 5% 1/4W
R024	1-249-437-11	CARBON 47K 5% 1/4W
R101	1-249-410-11	CARBON 270 5% 1/4W
R102	1-215-469-00	METAL 100K 1% 1/6W
R103	1-249-405-11	CARBON 100 5% 1/4W
R104	1-215-464-00	METAL 62K 1% 1/6W
R105	1-249-405-11	CARBON 100 5% 1/4W
R106	1-249-426-11	CARBON 5.6K 5% 1/4W
R107	1-249-411-11	CARBON 330 5% 1/4W
R108	1-215-469-00	METAL 100K 1% 1/6W
R109	1-249-405-11	CARBON 100 5% 1/4W
R110	1-215-464-00	METAL 62K 1% 1/6W
R111	1-249-405-11	CARBON 100 5% 1/4W

REF.NO.	PART NO.	DESCRIPTION				REMARK
R112	1-249-426-11	CARBON	5.6K	5%	1/4W	
R113	1-249-425-11	CARBON	4.7K	5%	1/4W	
R114	1-215-469-00	METAL	100K	1%	1/6W	
R115	1-249-405-11	CARBON	100	5%	1/4W	
R116	1-215-464-00	METAL	62K	1%	1/6W	
R117	1-249-405-11	CARBON	100	5%	1/4W	
R118	1-249-426-11	CARBON	5.6K	5%	1/4W	
R119	1-249-399-11	CARBON	33	5%	1/4W	
R120	1-249-399-11	CARBON	33	5%	1/4W	
R121	1-249-428-11	CARBON	8.2K	5%	1/4W	
R122	1-249-429-11	CARBON	10K	5%	1/4W	
R123	1-249-427-11	CARBON	6.8K	5%	1/4W	
R124	1-249-405-11	CARBON	100	5%	1/4W	
R125	1-249-401-11	CARBON	47	5%	1/4W	
R126	1-249-401-11	CARBON	47	5%	1/4W	
R127	1-215-397-00	METAL	100	1%	1/6W	
R128	1-215-405-00	METAL	220	1%	1/6W	
R129	1-215-423-00	METAL	1.2K	1%	1/6W	
R130	1-215-435-00	METAL	3.9K	1%	1/6W	
R131	1-215-469-00	METAL	100K	1%	1/6W	
R132	1-215-441-00	METAL	6.8K	1%	1/6W	
R133	1-215-443-00	METAL	8.2K	1%	1/6W	
R134	1-249-427-11	CARBON	6.8K	5%	1/4W	
R135	1-249-405-11	CARBON	100	5%	1/4W	
R136	1-215-445-00	METAL	10K	1%	1/6W	
R137	1-215-415-00	METAL	560	1%	1/6W	
R138	1-215-443-00	METAL	8.2K	1%	1/6W	
R139	1-215-419-00	METAL	820	1%	1/6W	
R140	1-215-443-00	METAL	8.2K	1%	1/6W	
R141	1-215-433-00	METAL	3.3K	1%	1/6W	
R142	1-249-415-11	CARBON	680	5%	1/4W	
R143	1-215-427-00	METAL	1.8K	1%	1/6W	
R144	1-249-401-11	CARBON	47	5%	1/4W	
R145	1-249-421-11	CARBON	2.2K	5%	1/4W	
R146	1-249-431-11	CARBON	15K	5%	1/4W	
R147	1-215-435-00	METAL	3.9K	1%	1/6W	
R148	1-249-425-11	CARBON	4.7K	5%	1/4W	
R149	1-249-437-11	CARBON	47K	5%	1/4W	
R150	1-247-881-00	CARBON	120K	5%	1/4W	
R151	1-247-895-00	CARBON	470K	5%	1/4W	
R152	1-249-416-11	CARBON	820	5%	1/4W	
R153	1-215-411-00	METAL	390	1%	1/6W	
R154	1-249-418-11	CARBON	1.2K	5%	1/4W	
R155	1-215-441-00	METAL	6.8K	1%	1/6W	
R156	1-215-413-00	METAL	470	1%	1/6W	
R157	1-249-425-11	CARBON	4.7K	5%	1/4W	
R158	1-247-887-00	CARBON	220K	5%	1/4W	
R159	1-249-423-11	CARBON	3.3K	5%	1/4W	
R160	1-249-421-11	CARBON	2.2K	5%	1/4W	
R161	1-249-419-11	CARBON	1.5K	5%	1/4W	
R162	1-249-421-11	CARBON	2.2K	5%	1/4W	
R163	1-249-421-11	CARBON	2.2K	5%	1/4W	
R164	1-249-405-11	CARBON	100	5%	1/4W	
R165	1-249-405-11	CARBON	100	5%	1/4W	
R166	1-249-429-11	CARBON	10K	5%	1/4W	
R167	1-249-405-11	CARBON	100	5%	1/4W	
R168	1-249-425-11	CARBON	4.7K	5%	1/4W	
R169	1-249-405-11	CARBON	100	5%	1/4W	
R170	1-249-405-11	CARBON	100	5%	1/4W	
R171	1-249-414-11	CARBON	560	5%	1/4W	
R172	1-249-414-11	CARBON	560	5%	1/4W	
R173	1-249-430-11	CARBON	12K	5%	1/4W	
R174	1-249-405-11	CARBON	100	5%	1/4W	
R175	1-249-429-11	CARBON	10K	5%	1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R176	1-249-429-11	CARBON	10K	5%	1/4W	
R177	1-247-889-00	CARBON	270K	5%	1/4W	
R178	1-249-423-11	CARBON	3.3K	5%	1/4W	
R179	1-215-421-00	METAL	1K	1%	1/6W	
R180	1-215-441-00	METAL	6.8K	1%	1/6W	
R181	1-215-469-00	METAL	100K	1%	1/6W	
R182	1-215-460-00	METAL	43K	1%	1/6W	
R183	1-215-465-00	METAL	68K	1%	1/6W	
R184	1-215-441-00	METAL	6.8K	1%	1/6W	
R185	1-249-416-11	CARBON	820	5%	1/4W	
R187	1-249-417-11	CARBON	1K	5%	1/4W	
R188	1-249-393-11	CARBON	10	5%	1/4W	
R189	1-249-405-11	CARBON	100	5%	1/4W	
R190	1-249-405-11	CARBON	100	5%	1/4W	
R201	1-249-417-11	CARBON	1K	5%	1/4W	
R202	1-249-421-11	CARBON	2.2K	5%	1/4W	
R203	1-249-417-11	CARBON	1K	5%	1/4W	
R204	1-249-393-11	CARBON	10	5%	1/4W	
R205	1-249-417-11	CARBON	1K	5%	1/4W	
R206	1-249-405-11	CARBON	100	5%	1/4W	
R207	1-215-421-00	METAL	1K	1%	1/6W	
R208	1-215-421-00	METAL	1K	1%	1/6W	
R209	1-215-421-00	METAL	1K	1%	1/6W	
R210	1-215-437-00	METAL	4.7K	1%	1/6W	
R211	1-215-459-00	METAL	39K	1%	1/6W	
R212	1-249-429-11	CARBON	10K	5%	1/4W	
R213	1-249-425-11	CARBON	4.7K	5%	1/4W	
R214	1-249-429-11	CARBON	10K	5%	1/4W	
R221	1-249-414-11	CARBON	560	5%	1/4W	
R222	1-249-414-11	CARBON	560	5%	1/4W	
R301	1-249-421-11	CARBON	2.2K	5%	1/4W	
R302	1-249-421-11	CARBON	2.2K	5%	1/4W	
R303	1-249-405-11	CARBON	100	5%	1/4W	
R304	1-249-405-11	CARBON	100	5%	1/4W	
R305	1-249-429-11	CARBON	10K	5%	1/4W	
R306	1-249-405-11	CARBON	100	5%	1/4W	
R307	1-249-425-11	CARBON	4.7K	5%	1/4W	
R308	1-249-405-11	CARBON	100	5%	1/4W	
R309	1-249-405-11	CARBON	100	5%	1/4W	
R310	1-249-430-11	CARBON	12K	5%	1/4W	
R311	1-249-417-11	CARBON	1K	5%	1/4W	
R312	1-249-417-11	CARBON	1K	5%	1/4W	
R313	1-249-405-11	CARBON	100	5%	1/4W	
R314	1-249-429-11	CARBON	10K	5%	1/4W	
R315	1-249-429-11	CARBON	10K	5%	1/4W	
R316	1-247-889-00	CARBON	270K	5%	1/4W	
R317	1-249-423-11	CARBON	3.3K	5%	1/4W	
R318	1-249-405-11	CARBON	100	5%	1/4W	
R319	1-249-437-11	CARBON	47K	5%	1/4W	
R320	1-249-429-11	CARBON	10K	5%	1/4W	
R321	1-215-433-00	METAL	3.3K	1%	1/6W	
R322	1-215-433-00	METAL	3.3K	1%	1/6W	
R323	1-249-423-11	CARBON	3.3K	5%	1/4W	
R324	1-215-460-00	METAL	43K	1%	1/6W	
R325	1-215-449-00	METAL	15K	1%	1/6W	
R326	1-249-417-11	CARBON	1K	5%	1/4W	

<VARIABLE RESISTOR>

RV101	1-237-520-21	RES, ADJ, CERMET 50K	
RV102	1-237-520-21	RES, ADJ, CERMET 50K	
RV201	1-237-520-21	RES, ADJ, CERMET 50K	
RV202	1-237-518-21	RES, ADJ, CERMET 10K	
RV203	1-237-518-21	RES, ADJ, CERMET 10K	

REF.NO.	PART NO.	DESCRIPTION			REMARK
RV204	1-237-517-21	RES, ADJ, CERMET 5K			
RV301	1-237-519-21	RES, ADJ, CERMET 20K			

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*A-1296-453-A BG BOARD, COMPLETE
****

*4-353-708-00 HOOK, FINGER

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION
BG1	*1-562-729-11	CONNECTOR, MULTI 64P
	4-378-915-01	NUT (M2.6), PLATE; BG1

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION			REMARK
C1	1-124-477-11	ELECT	47MF	20%	25V
C2	1-101-004-00	CERAMIC	0.01MF		50V
C3	1-124-589-11	ELECT	47MF	20%	16V
C4	1-101-004-00	CERAMIC	0.01MF		50V
C5	1-124-120-11	ELECT	220MF	20%	25V
C6	1-124-589-11	ELECT	47MF	20%	16V
C7	1-101-004-00	CERAMIC	0.01MF		50V
C8	1-124-120-11	ELECT	220MF	20%	25V
C9	1-124-477-11	ELECT	47MF	20%	25V
C10	1-101-004-00	CERAMIC	0.01MF		50V
C11	1-124-477-11	ELECT	47MF	20%	25V
C12	1-101-004-00	CERAMIC	0.01MF		50V
C13	1-124-120-11	ELECT	220MF	20%	25V
C100	1-136-165-00	FILM	0.1MF	5%	50V
C101	1-124-589-11	ELECT	47MF	20%	16V
C102	1-101-004-00	CERAMIC	0.01MF		50V
C103	1-101-004-00	CERAMIC	0.01MF		50V
C104	1-101-004-00	CERAMIC	0.01MF		50V
C105	1-101-004-00	CERAMIC	0.01MF		50V
C106	1-101-004-00	CERAMIC	0.01MF		50V
C107	1-101-004-00	CERAMIC	0.01MF		50V
C108	1-101-004-00	CERAMIC	0.01MF		50V
C109	1-124-589-11	ELECT	47MF	20%	16V
C110	1-101-004-00	CERAMIC	0.01MF		50V
C111	1-101-004-00	CERAMIC	0.01MF		50V
C112	1-101-004-00	CERAMIC	0.01MF		50V
C113	1-101-004-00	CERAMIC	0.01MF		50V
C114	1-123-875-11	ELECT	10MF	20%	50V
C115	1-124-261-00	ELECT	10MF	20%	50V
C116	1-101-004-00	CERAMIC	0.01MF		50V
C119	1-124-477-11	ELECT	47MF	20%	25V
C120	1-101-004-00	CERAMIC	0.01MF		50V
C121	1-124-477-11	ELECT	47MF	20%	25V
C122	1-101-004-00	CERAMIC	0.01MF		50V
C123	1-101-004-00	CERAMIC	0.01MF		50V
C124	1-136-161-00	FILM	0.047MF	5%	50V
C125	1-123-875-11	ELECT	10MF	20%	50V
C126	1-136-161-00	FILM	0.047MF	5%	50V
C127	1-101-004-00	CERAMIC	0.01MF		50V
C128	1-101-004-00	CERAMIC	0.01MF		50V
C129	1-101-004-00	CERAMIC	0.01MF		50V
C130	1-101-004-00	CERAMIC	0.01MF		50V
C131	1-101-004-00	CERAMIC	0.01MF		50V
C132	1-101-004-00	CERAMIC	0.01MF		50V
C133	1-102-824-00	CERAMIC	470PF	5%	50V
C200	1-124-477-11	ELECT	47MF	20%	25V
C201	1-101-004-00	CERAMIC	0.01MF		50V
C202	1-102-959-00	CERAMIC	22PF	5%	50V
C203	1-102-973-00	CERAMIC	100PF	5%	50V
C204	1-102-973-00	CERAMIC	100PF	5%	50V
C205	1-102-074-00	CERAMIC	0.001MF	10%	50V
C206	1-101-004-00	CERAMIC	0.01MF		50V
C207	1-101-004-00	CERAMIC	0.01MF		50V
C208	1-101-004-00	CERAMIC	0.01MF		50V
C209	1-102-959-00	CERAMIC	22PF	5%	50V
C210	1-102-973-00	CERAMIC	100PF	5%	50V
C211	1-101-004-00	CERAMIC	0.01MF		50V
C212	1-102-959-00	CERAMIC	22PF	5%	50V
C213	1-102-959-00	CERAMIC	22PF	5%	50V
C214	1-101-004-00	CERAMIC	0.01MF		50V
C215	1-102-973-00	CERAMIC	100PF	5%	50V
C216	1-102-074-00	CERAMIC	0.001MF	10%	50V
C217	1-101-004-00	CERAMIC	0.01MF		50V
C218	1-101-004-00	CERAMIC	0.01MF		50V
C219	1-124-443-00	ELECT	100MF	20%	10V
C220	1-101-004-00	CERAMIC	0.01MF		50V
C221	1-124-478-11	ELECT	100MF	20%	25V
C222	1-101-004-00	CERAMIC	0.01MF		50V
C223	1-124-477-11	ELECT	47MF	20%	25V
C301	1-101-004-00	CERAMIC	0.01MF		50V
C302	1-102-824-00	CERAMIC	470PF	5%	50V
C303	1-102-959-00	CERAMIC	22PF	5%	50V
C305	1-101-004-00	CERAMIC	0.01MF		50V
C306	1-101-004-00	CERAMIC	0.01MF		50V
C307	1-101-004-00	CERAMIC	0.01MF		50V
C308	1-101-004-00	CERAMIC	0.01MF		50V
C309	1-102-973-00	CERAMIC	100PF	5%	50V
C310	1-102-074-00	CERAMIC	0.001MF	10%	50V
C311	1-101-004-00	CERAMIC	0.01MF		50V
C312	1-101-004-00	CERAMIC	0.01MF		50V
C313	1-102-973-00	CERAMIC	100PF	5%	50V
C314	1-102-074-00	CERAMIC	0.001MF	10%	50V
C315	1-101-004-00	CERAMIC	0.01MF		50V
C316	1-101-004-00	CERAMIC	0.01MF		50V
C317	1-101-004-00	CERAMIC	0.01MF		50V
C318	1-101-361-00	CERAMIC	150PF	5%	50V
C319	1-101-361-00	CERAMIC	150PF	5%	50V
C320	1-102-973-00	CERAMIC	100PF	5%	50V
C321	1-102-074-00	CERAMIC	0.001MF	10%	50V
C322	1-123-875-11	ELECT	10MF	20%	50V
C323	1-101-004-00	CERAMIC	0.01MF		50V
C324	1-101-004-00	CERAMIC	0.01MF		50V
C325	1-102-973-00	CERAMIC	100PF	5%	50V
C326	1-102-074-00	CERAMIC	0.001MF	10%	50V
C327	1-101-004-00	CERAMIC	0.01MF		50V
C328	1-101-004-00	CERAMIC	0.01MF		50V
C329	1-124-443-00	ELECT	100MF	20%	10V
C330	1-101-004-00	CERAMIC	0.01MF		50V
C331	1-124-478-11	ELECT	100MF	20%	25V
C332	1-101-004-00	CERAMIC	0.01MF		50V
C333	1-124-443-00	ELECT	100MF	20%	10V
C334	1-101-004-00	CERAMIC	0.01MF		50V
C335	1-124-477-11	ELECT	47MF	20%	25V
C336	1-101-004-00	CERAMIC	0.01MF		50V
C337	1-124-791-11	ELECT	1MF	20%	50V
C338	1-123-875-11	ELECT	10MF	20%	50V

<DIODE>

REF.NO.	PART NO.	DESCRIPTION
D1	8-719-911-19	DIODE 1SS119
D101	8-719-911-19	DIODE 1SS119

REF.NO.	PART NO.	DESCRIPTION	REMARK
D201	8-719-110-08	DIODE RD8.2ES-B2	
D202	8-719-911-19	DIODE 1SS119	
D203	8-719-110-08	DIODE RD8.2ES-B2	
D204	8-719-911-19	DIODE 1SS119	
D301	8-719-110-08	DIODE RD8.2ES-B2	
D302	8-719-911-19	DIODE 1SS119	
D303	8-719-110-08	DIODE RD8.2ES-B2	
D304	8-719-911-19	DIODE 1SS119	
D305	8-719-110-08	DIODE RD8.2ES-B2	
D306	8-719-911-19	DIODE 1SS119	
D307	8-719-110-08	DIODE RD8.2ES-B2	
D308	8-719-911-19	DIODE 1SS119	
D309	8-719-911-19	DIODE 1SS119	

<IC>

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC1	8-759-924-12	IC LM7805CT	
IC101	8-759-014-95	IC MC1495L	
IC102	8-759-990-82	IC TL082CP	
IC103	8-759-990-82	IC TL082CP	
IC104	8-759-240-53	IC TC4053BP	
IC105	8-759-007-21	IC MC74HC4053N	
IC201	8-759-203-83	IC TC74HC4538P	
IC202	8-759-203-83	IC TC74HC4538P	
IC203	8-759-203-83	IC TC74HC4538P	
IC204	8-759-202-85	IC TC74HC112P	
IC301	8-759-203-83	IC TC74HC4538P	
IC302	8-759-917-11	IC SN74HC393N	
IC303	8-759-916-12	IC SN74HC00N	
IC304	8-759-203-05	IC TC74HC193P	
IC305	8-759-203-05	IC TC74HC193P	
IC306	8-759-203-83	IC TC74HC4538P	
IC307	8-759-916-12	IC SN74HC00N	
IC308	8-759-202-85	IC TC74HC112P	

<COIL>

REF.NO.	PART NO.	DESCRIPTION	REMARK
L1	1-408-429-00	INDUCTOR 470UH	
L2	1-408-429-00	INDUCTOR 470UH	
L3	1-408-429-00	INDUCTOR 470UH	

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q101	8-729-201-05	TRANSISTOR 2SC2878-B	
Q102	8-729-201-05	TRANSISTOR 2SC2878-B	
Q103	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q104	8-729-201-05	TRANSISTOR 2SC2878-B	
Q105	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q106	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q107	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q110	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q111	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q112	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q113	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q114	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q115	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q116	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q117	8-729-802-45	TRANSISTOR 2SK125-5	
Q118	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q200	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q201	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q202	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q203	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q204	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q205	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q206	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q207	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q208	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q300	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q301	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q302	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q303	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q304	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q305	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q306	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q307	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q308	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q309	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q310	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q311	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q312	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q313	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q314	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q315	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q316	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q317	8-729-900-36	TRANSISTOR DTC124ES	
Q318	8-729-900-36	TRANSISTOR DTC124ES	
Q319	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q320	8-729-119-76	TRANSISTOR 2SA1175-HFE	

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
R100	1-249-405-11	CARBON	100	5%	1/4W	
R102	1-249-405-11	CARBON	100	5%	1/4W	
R103	1-215-449-00	METAL	15K	1%	1/6W	
R104	1-215-429-00	METAL	2.2K	1%	1/6W	
R105	1-215-449-00	METAL	15K	1%	1/6W	
R106	1-215-429-00	METAL	2.2K	1%	1/6W	
R107	1-215-449-00	METAL	15K	1%	1/6W	
R108	1-215-444-00	METAL	9.1K	1%	1/6W	
R109	1-215-444-00	METAL	9.1K	1%	1/6W	
R110	1-215-413-00	METAL	470	1%	1/6W	
R111	1-249-435-11	CARBON	33K	5%	1/4W	
R112	1-215-433-00	METAL	3.3K	1%	1/6W	
R113	1-215-433-00	METAL	3.3K	1%	1/6W	
R114	1-215-445-00	METAL	10K	1%	1/6W	
R115	1-215-416-00	METAL	620	1%	1/6W	
R116	1-215-445-00	METAL	10K	1%	1/6W	
R117	1-215-447-00	METAL	12K	1%	1/6W	
R118	1-215-417-00	METAL	680	1%	1/6W	
R119	1-215-445-00	METAL	10K	1%	1/6W	
R120	1-215-435-00	METAL	3.9K	1%	1/6W	
R121	1-249-435-11	CARBON	33K	5%	1/4W	
R122	1-249-435-11	CARBON	33K	5%	1/4W	
R123	1-249-435-11	CARBON	33K	5%	1/4W	
R124	1-249-429-11	CARBON	10K	5%	1/4W	
R125	1-249-435-11	CARBON	33K	5%	1/4W	
R126	1-215-443-00	METAL	8.2K	1%	1/6W	
R127	1-215-445-00	METAL	10K	1%	1/6W	
R128	1-215-419-00	METAL	820	1%	1/6W	
R129	1-215-435-00	METAL	3.9K	1%	1/6W	
R130	1-215-437-00	METAL	4.7K	1%	1/6W	
R131	1-215-437-00	METAL	4.7K	1%	1/6W	
R132	1-249-422-11	CARBON	2.7K	5%	1/4W	
R133	1-215-401-11	METAL	150	1%	1/6W	
R134	1-215-401-11	METAL	150	1%	1/6W	
R135	1-215-445-00	METAL	10K	1%	1/6W	

BG **CA**

REF.NO.	PART NO.	DESCRIPTION				REMARK
R136	1-215-445-00	METAL	10K	1%	1/6W	
R137	1-215-425-00	METAL	1.5K	1%	1/6W	
R138	1-215-446-00	METAL	11K	1%	1/6W	
R139	1-215-425-00	METAL	1.5K	1%	1/6W	
R140	1-215-447-00	METAL	12K	1%	1/6W	
R144	1-215-417-00	METAL	680	1%	1/6W	
R145	1-215-427-00	METAL	1.8K	1%	1/6W	
R146	1-215-439-00	METAL	5.6K	1%	1/6W	
R147	1-215-439-00	METAL	5.6K	1%	1/6W	
R148	1-249-403-11	CARBON	68	5%	1/4W	
R150	1-215-427-00	METAL	1.8K	1%	1/6W	
R151	1-215-439-00	METAL	5.6K	1%	1/6W	
R152	1-215-439-00	METAL	5.6K	1%	1/6W	
R153	1-249-403-11	CARBON	68	5%	1/4W	
R154	1-215-419-00	METAL	820	1%	1/6W	
R155	1-215-416-00	METAL	620	1%	1/6W	
R156	1-249-417-11	CARBON	1K	5%	1/4W	
R157	1-249-399-11	CARBON	33	5%	1/4W	
R158	1-249-419-11	CARBON	1.5K	5%	1/4W	
R159	1-249-393-11	CARBON	10	5%	1/4W	
R160	1-249-405-11	CARBON	100	5%	1/4W	
R161	1-215-445-00	METAL	10K	1%	1/6W	
R162	1-215-416-00	METAL	620	1%	1/6W	
R163	1-249-429-11	CARBON	10K	5%	1/4W	
R164	1-249-417-11	CARBON	1K	5%	1/4W	
R165	1-249-405-11	CARBON	100	5%	1/4W	
R166	1-249-441-11	CARBON	100K	5%	1/4W	
R167	1-247-903-00	CARBON	1M	5%	1/4W	
R168	1-215-420-00	METAL	910	1%	1/6W	
R169	1-215-445-00	METAL	10K	1%	1/6W	
R170	1-215-436-00	METAL	4.3K	1%	1/6W	
R173	1-249-429-11	CARBON	10K	5%	1/4W	
R174	1-249-405-11	CARBON	100	5%	1/4W	
R175	1-249-405-11	CARBON	100	5%	1/4W	
R176	1-215-487-00	METAL	560K	1%	1/6W	
R201	1-249-427-11	CARBON	6.8K	5%	1/4W	
R202	1-249-423-11	CARBON	3.3K	5%	1/4W	
R203	1-249-430-11	CARBON	12K	5%	1/4W	
R204	1-215-426-00	METAL	1.6K	1%	1/6W	
R205	1-215-433-00	METAL	3.3K	1%	1/6W	
R206	1-249-421-11	CARBON	2.2K	5%	1/4W	
R207	1-249-425-11	CARBON	4.7K	5%	1/4W	
R208	1-249-425-11	CARBON	4.7K	5%	1/4W	
R209	1-249-417-11	CARBON	1K	5%	1/4W	
R210	1-249-429-11	CARBON	10K	5%	1/4W	
R211	1-249-405-11	CARBON	100	5%	1/4W	
R212	1-215-421-00	METAL	1K	1%	1/6W	
R213	1-215-433-00	METAL	3.3K	1%	1/6W	
R214	1-215-421-00	METAL	1K	1%	1/6W	
R215	1-215-421-00	METAL	1K	1%	1/6W	
R216	1-249-421-11	CARBON	2.2K	5%	1/4W	
R217	1-249-425-11	CARBON	4.7K	5%	1/4W	
R218	1-249-425-11	CARBON	4.7K	5%	1/4W	
R219	1-249-417-11	CARBON	1K	5%	1/4W	
R220	1-249-429-11	CARBON	10K	5%	1/4W	
R221	1-249-405-11	CARBON	100	5%	1/4W	
R222	1-249-426-11	CARBON	5.6K	5%	1/4W	
R223	1-249-425-11	CARBON	4.7K	5%	1/4W	
R301	1-249-427-11	CARBON	6.8K	5%	1/4W	
R302	1-249-423-11	CARBON	3.3K	5%	1/4W	
R303	1-249-430-11	CARBON	12K	5%	1/4W	
R304	1-215-468-00	METAL	91K	1%	1/6W	
R305	1-215-421-00	METAL	1K	1%	1/6W	
R309	1-249-421-11	CARBON	2.2K	5%	1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R310	1-249-425-11	CARBON	4.7K	5%	1/4W	
R311	1-249-425-11	CARBON	4.7K	5%	1/4W	
R312	1-249-417-11	CARBON	1K	5%	1/4W	
R313	1-249-429-11	CARBON	10K	5%	1/4W	
R314	1-249-405-11	CARBON	100	5%	1/4W	
R315	1-249-421-11	CARBON	2.2K	5%	1/4W	
R316	1-249-425-11	CARBON	4.7K	5%	1/4W	
R317	1-249-425-11	CARBON	4.7K	5%	1/4W	
R318	1-249-417-11	CARBON	1K	5%	1/4W	
R319	1-249-429-11	CARBON	10K	5%	1/4W	
R320	1-249-405-11	CARBON	100	5%	1/4W	
R321	1-215-461-00	METAL	47K	1%	1/6W	
R322	1-215-467-00	METAL	82K	1%	1/6W	
R323	1-249-421-11	CARBON	2.2K	5%	1/4W	
R324	1-249-425-11	CARBON	4.7K	5%	1/4W	
R325	1-249-425-11	CARBON	4.7K	5%	1/4W	
R326	1-249-417-11	CARBON	1K	5%	1/4W	
R327	1-249-429-11	CARBON	10K	5%	1/4W	
R328	1-249-405-11	CARBON	100	5%	1/4W	
R329	1-249-421-11	CARBON	2.2K	5%	1/4W	
R330	1-249-425-11	CARBON	4.7K	5%	1/4W	
R331	1-249-425-11	CARBON	4.7K	5%	1/4W	
R332	1-249-417-11	CARBON	1K	5%	1/4W	
R333	1-249-429-11	CARBON	10K	5%	1/4W	
R334	1-249-405-11	CARBON	100	5%	1/4W	
R335	1-249-426-11	CARBON	5.6K	5%	1/4W	
R336	1-249-421-11	CARBON	2.2K	5%	1/4W	
R337	1-249-405-11	CARBON	100	5%	1/4W	
R338	1-249-405-11	CARBON	100	5%	1/4W	
R339	1-249-405-11	CARBON	100	5%	1/4W	
R340	1-249-441-11	CARBON	100K	5%	1/4W	

<VARIABLE RESISTOR>

RV101	1-237-516-21	RES, ADJ, CERMET 2K
RV102	1-237-519-21	RES, ADJ, CERMET 20K
RV103	1-237-519-21	RES, ADJ, CERMET 20K
RV201	1-237-517-21	RES, ADJ, CERMET 5K
RV202	1-237-517-21	RES, ADJ, CERMET 5K

****

*A-1296-687-A CA BOARD, COMPLETE
****

*1-526-575-00 SOCKET, PLUG 1P
4-373-933-01 SHEET (TRANSISTOR), BN

<CAPACITOR>

C102	1-101-361-00	CERAMIC	150PF	5%	50V
C103	1-108-696-11	MYLAR	0.022MF	10%	200V
C104	1-126-103-11	ELECT	470MF	20%	16V
C105	1-101-004-00	CERAMIC	0.01MF		50V
C106	1-124-798-11	ELECT	1MF	20%	160V
C107	1-102-973-00	CERAMIC	100PF	5%	50V
C108	1-123-356-00	ELECT	10MF	20%	25V
C109	1-102-824-00	CERAMIC	470PF	5%	50V
C110	1-124-963-11	ELECT	33MF	20%	16V
C111	1-101-004-00	CERAMIC	0.01MF		50V
C112	1-124-963-11	ELECT	33MF	20%	16V
C113	1-123-932-00	ELECT	4.7MF	20%	160V
C114	1-102-947-00	CERAMIC	10PF	0.5PF	50V
C115	1-102-820-00	CERAMIC	330PF	5%	50V
C116	1-101-004-00	CERAMIC	0.01MF		50V

REF.NO.	PART NO.	DESCRIPTION			REMARK
C202	1-101-361-00	CERAMIC	150PF	5%	50V
C203	1-108-696-11	MYLAR	0.022MF	10%	200V
C204	1-126-103-11	ELECT	470MF	20%	16V
C205	1-101-004-00	CERAMIC	0.01MF		50V
C206	1-124-798-11	ELECT	1MF	20%	160V
C207	1-102-973-00	CERAMIC	100PF	5%	50V
C208	1-123-356-00	ELECT	10MF	20%	25V
C209	1-102-824-00	CERAMIC	470PF	5%	50V
C210	1-124-963-11	ELECT	33MF	20%	16V
C211	1-101-004-00	CERAMIC	0.01MF		50V
C212	1-124-963-11	ELECT	33MF	20%	16V
C213	1-123-932-00	ELECT	4.7MF	20%	160V
C214	1-102-947-00	CERAMIC	10PF	0.5PF	50V
C215	1-102-820-00	CERAMIC	330PF	5%	50V
C216	1-101-004-00	CERAMIC	0.01MF		50V
C302	1-101-361-00	CERAMIC	150PF	5%	50V
C303	1-108-696-11	MYLAR	0.022MF	10%	200V
C304	1-126-103-11	ELECT	470MF	20%	16V
C305	1-101-004-00	CERAMIC	0.01MF		50V
C306	1-124-798-11	ELECT	1MF	20%	160V
C307	1-102-973-00	CERAMIC	100PF	5%	50V
C308	1-123-356-00	ELECT	10MF	20%	25V
C309	1-102-824-00	CERAMIC	470PF	5%	50V
C310	1-124-963-11	ELECT	33MF	20%	16V
C311	1-101-004-00	CERAMIC	0.01MF		50V
C312	1-124-963-11	ELECT	33MF	20%	16V
C313	1-123-932-00	ELECT	4.7MF	20%	160V
C314	1-102-947-00	CERAMIC	10PF	0.5PF	50V
C315	1-102-820-00	CERAMIC	330PF	5%	50V
C316	1-101-004-00	CERAMIC	0.01MF		50V
C401	1-162-318-11	CERAMIC	0.001MF	10%	500V
C402	1-124-798-11	ELECT	1MF	20%	160V
C403	1-162-318-11	CERAMIC	0.001MF	10%	500V
C404	1-124-798-11	ELECT	1MF	20%	160V
C405	1-162-318-11	CERAMIC	0.001MF	10%	500V
C406	1-124-798-11	ELECT	1MF	20%	160V
C407	1-124-634-11	ELECT	1MF	20%	450V
C408	1-124-634-11	ELECT	1MF	20%	450V
C409	1-124-634-11	ELECT	1MF	20%	450V
C410	1-101-004-00	CERAMIC	0.01MF		50V
C412	1-102-820-00	CERAMIC	330PF	5%	50V
C413	1-102-959-00	CERAMIC	22PF	5%	50V
C415	1-123-333-00	ELECT	100MF	20%	16V
C416	1-124-798-11	ELECT	1MF	20%	160V
C417	1-124-963-11	ELECT	33MF	20%	16V
C418	1-123-932-00	ELECT	4.7MF	20%	160V
C419	1-124-046-00	ELECT	10MF	20%	160V
C420	1-124-046-00	ELECT	10MF	20%	160V
C421	1-124-046-00	ELECT	10MF	20%	160V
C424	1-123-334-00	ELECT	220MF	20%	25V
C426	1-101-004-00	CERAMIC	0.01MF		50V
C429	1-123-334-00	ELECT	220MF	20%	25V
C431	1-101-004-00	CERAMIC	0.01MF		50V
C701	1-136-173-00	FILM	0.47MF	5%	50V
C702	1-101-004-00	CERAMIC	0.01MF		50V
C703	1-131-345-00	TANTALUM	0.47MF	10%	35V
C704	1-101-004-00	CERAMIC	0.01MF		50V
C705	1-101-004-00	CERAMIC	0.01MF		50V
C706	1-101-004-00	CERAMIC	0.01MF		50V
C707	1-101-004-00	CERAMIC	0.01MF		50V
C708	1-124-963-11	ELECT	33MF	20%	16V
C709	1-101-004-00	CERAMIC	0.01MF		50V
C710	1-101-004-00	CERAMIC	0.01MF		50V
C711	1-124-963-11	ELECT	33MF	20%	16V

REF.NO.	PART NO.	DESCRIPTION			REMARK
C712	1-101-004-00	CERAMIC	0.01MF		50V
C801	1-136-173-00	FILM	0.47MF	5%	50V
C802	1-101-004-00	CERAMIC	0.01MF		50V
C803	1-131-345-00	TANTALUM	0.47MF	10%	35V
C804	1-101-004-00	CERAMIC	0.01MF		50V
C805	1-101-004-00	CERAMIC	0.01MF		50V
C806	1-101-004-00	CERAMIC	0.01MF		50V
C807	1-101-004-00	CERAMIC	0.01MF		50V
C808	1-124-963-11	ELECT	33MF	20%	16V
C809	1-101-004-00	CERAMIC	0.01MF		50V
C810	1-101-004-00	CERAMIC	0.01MF		50V
C811	1-124-963-11	ELECT	33MF	20%	16V
C812	1-101-004-00	CERAMIC	0.01MF		50V
C901	1-136-173-00	FILM	0.47MF	5%	50V
C902	1-101-004-00	CERAMIC	0.01MF		50V
C903	1-131-345-00	TANTALUM	0.47MF	10%	35V
C904	1-101-004-00	CERAMIC	0.01MF		50V
C905	1-101-004-00	CERAMIC	0.01MF		50V
C906	1-101-004-00	CERAMIC	0.01MF		50V
C907	1-101-004-00	CERAMIC	0.01MF		50V
C908	1-124-963-11	ELECT	33MF	20%	16V
C909	1-101-004-00	CERAMIC	0.01MF		50V
C910	1-101-004-00	CERAMIC	0.01MF		50V
C911	1-124-963-11	ELECT	33MF	20%	16V
C912	1-101-004-00	CERAMIC	0.01MF		50V

<CONNECTOR>

CA1	*1-566-056-11	PIN, CONNECTOR 4P
CA2	*1-566-056-11	PIN, CONNECTOR 4P
CA3	*1-566-056-11	PIN, CONNECTOR 4P
CA4	*1-566-055-11	PIN, CONNECTOR 3P
CA5	*1-566-056-11	PIN, CONNECTOR 4P
CA6	*1-566-054-11	PIN, CONNECTOR 2P
CA7	*1-566-054-11	PIN, CONNECTOR 2P
CA8	*1-566-057-11	PIN, CONNECTOR 5P
CA9	*1-566-056-11	PIN, CONNECTOR 4P
CA10	*1-566-056-11	PIN, CONNECTOR 4P
CA11	*1-566-056-11	PIN, CONNECTOR 4P
CA12	*1-566-059-11	PIN, CONNECTOR 7P
CA13	*1-566-059-11	PIN, CONNECTOR 7P

<TRIMMER>

CV101	1-141-181-11	CAP,TRIMMER
CV201	1-141-181-11	CAP,TRIMMER
CV301	1-141-181-11	CAP,TRIMMER

<DIODE>

D101	8-719-911-19	DIODE 1SS119
D102	8-719-911-19	DIODE 1SS119
D103	8-719-911-19	DIODE 1SS119
D104	8-719-109-72	DIODE RD3.9ES-B2
D106	8-719-110-13	DIODE RD9.1ES-B2
D107	8-719-901-83	DIODE 1SS83
D108	8-719-901-83	DIODE 1SS83
D109	8-719-110-22	DIODE RD11ES-B2
D112	8-719-911-19	DIODE 1SS119
D113	8-719-911-19	DIODE 1SS119
D114	8-719-911-19	DIODE 1SS119
D115	8-719-911-19	DIODE 1SS119
D201	8-719-911-19	DIODE 1SS119
D202	8-719-911-19	DIODE 1SS119

REF.NO.	PART NO.	DESCRIPTION	REMARK
D203	8-719-911-19	DIODE 1SS119	
D204	8-719-109-72	DIODE RD3.9ES-B2	
D206	8-719-110-13	DIODE RD9.1ES-B2	
D207	8-719-901-83	DIODE 1SS83	
D208	8-719-901-83	DIODE 1SS83	
D209	8-719-110-22	DIODE RD11ES-B2	
D212	8-719-911-19	DIODE 1SS119	
D213	8-719-911-19	DIODE 1SS119	
D214	8-719-911-19	DIODE 1SS119	
D215	8-719-911-19	DIODE 1SS119	
D301	8-719-911-19	DIODE 1SS119	
D302	8-719-911-19	DIODE 1SS119	
D303	8-719-911-19	DIODE 1SS119	
D304	8-719-109-72	DIODE RD3.9ES-B2	
D306	8-719-110-13	DIODE RD9.1ES-B2	
D307	8-719-901-83	DIODE 1SS83	
D308	8-719-901-83	DIODE 1SS83	
D309	8-719-110-22	DIODE RD11ES-B2	
D312	8-719-911-19	DIODE 1SS119	
D313	8-719-911-19	DIODE 1SS119	
D314	8-719-911-19	DIODE 1SS119	
D315	8-719-911-19	DIODE 1SS119	
D401	8-719-971-20	DIODE ERC38-06	
D402	8-719-971-20	DIODE ERC38-06	
D403	8-719-971-20	DIODE ERC38-06	
D404	8-719-911-19	DIODE 1SS119	
D406	8-719-971-20	DIODE ERC38-06	
D407	8-719-911-19	DIODE 1SS119	

<IC>

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC701	8-759-990-82	IC TL082CP	
IC702	8-741-131-30	IC BX-1313	
IC703	8-759-140-53	IC UPD4053BC	
IC801	8-759-990-82	IC TL082CP	
IC802	8-741-131-30	IC BX-1313	
IC803	8-759-140-53	IC UPD4053BC	
IC901	8-759-990-82	IC TL082CP	
IC902	8-741-131-30	IC BX-1313	
IC903	8-759-140-53	IC UPD4053BC	

<COIL>

REF.NO.	PART NO.	DESCRIPTION		REMARK
L101	1-408-429-00	INDUCTOR	470UH	
L102	1-408-429-00	INDUCTOR	470UH	
L103	1-408-429-00	INDUCTOR	470UH	
L104	1-408-429-00	INDUCTOR	470UH	
L105	1-408-429-00	INDUCTOR	470UH	
L201	1-408-429-00	INDUCTOR	470UH	
L202	1-408-429-00	INDUCTOR	470UH	
L203	1-408-429-00	INDUCTOR	470UH	
L204	1-408-429-00	INDUCTOR	470UH	
L205	1-408-429-00	INDUCTOR	470UH	
L301	1-408-429-00	INDUCTOR	470UH	
L302	1-408-429-00	INDUCTOR	470UH	
L303	1-408-429-00	INDUCTOR	470UH	
L304	1-408-429-00	INDUCTOR	470UH	
L305	1-408-429-00	INDUCTOR	470UH	
L401	1-408-429-00	INDUCTOR	470UH	
L402	1-408-429-00	INDUCTOR	470UH	
L403	1-408-417-00	INDUCTOR	47UH	
L404	1-408-429-00	INDUCTOR	470UH	
L405	1-408-429-00	INDUCTOR	470UH	
L406	1-459-155-00	COIL (WITH CORE)	45UH	

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q101	8-729-105-88	TRANSISTOR 2SC2570A	
Q102	8-729-105-88	TRANSISTOR 2SC2570A	
Q103	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q104	8-729-802-71	TRANSISTOR 2SA1407-D	
Q105	8-729-805-05	TRANSISTOR 2SC3601-E	
Q106	8-729-802-37	TRANSISTOR 2SC3595-D	
Q107	8-729-802-45	TRANSISTOR 2SK125-5	
Q108	8-729-802-45	TRANSISTOR 2SK125-5	
Q109	8-729-805-05	TRANSISTOR 2SC3601-E	
Q110	8-729-802-71	TRANSISTOR 2SA1407-D	
Q111	8-729-255-12	TRANSISTOR 2SC2551-O	
Q112	8-729-805-05	TRANSISTOR 2SC3601-E	
Q201	8-729-105-88	TRANSISTOR 2SC2570A	
Q202	8-729-105-88	TRANSISTOR 2SC2570A	
Q203	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q204	8-729-802-71	TRANSISTOR 2SA1407-D	
Q205	8-729-805-05	TRANSISTOR 2SC3601-E	
Q206	8-729-802-37	TRANSISTOR 2SC3595-D	
Q207	8-729-802-45	TRANSISTOR 2SK125-5	
Q208	8-729-802-45	TRANSISTOR 2SK125-5	
Q209	8-729-805-05	TRANSISTOR 2SC3601-E	
Q210	8-729-802-71	TRANSISTOR 2SA1407-D	
Q211	8-729-255-12	TRANSISTOR 2SC2551-O	
Q212	8-729-805-05	TRANSISTOR 2SC3601-E	
Q301	8-729-105-88	TRANSISTOR 2SC2570A	
Q302	8-729-105-88	TRANSISTOR 2SC2570A	
Q303	8-729-103-19	TRANSISTOR 2SA1206-K1	
Q304	8-729-802-71	TRANSISTOR 2SA1407-D	
Q305	8-729-805-05	TRANSISTOR 2SC3601-E	
Q306	8-729-802-37	TRANSISTOR 2SC3595-D	
Q307	8-729-802-45	TRANSISTOR 2SK125-5	
Q308	8-729-802-45	TRANSISTOR 2SK125-5	
Q309	8-729-805-05	TRANSISTOR 2SC3601-E	
Q310	8-729-802-71	TRANSISTOR 2SA1407-D	
Q311	8-729-255-12	TRANSISTOR 2SC2551-O	
Q312	8-729-805-05	TRANSISTOR 2SC3601-E	
Q401	8-729-891-02	TRANSISTOR 2SC2910-S	
Q402	8-729-820-82	TRANSISTOR 2SA1208-S	
Q403	8-729-820-82	TRANSISTOR 2SA1208-S	
Q404	8-729-891-02	TRANSISTOR 2SC2910-S	
Q405	8-729-820-82	TRANSISTOR 2SA1208-S	
Q406	8-729-820-82	TRANSISTOR 2SA1208-S	
Q407	8-729-891-02	TRANSISTOR 2SC2910-S	
Q408	8-729-820-82	TRANSISTOR 2SA1208-S	
Q409	8-729-820-82	TRANSISTOR 2SA1208-S	
Q410	8-729-891-02	TRANSISTOR 2SC2910-S	
Q411	8-729-820-82	TRANSISTOR 2SA1208-S	
Q412	8-729-322-78	TRANSISTOR 2SC2278	
Q413	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q414	8-729-903-68	TRANSISTOR 2SD982	

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
R101	1-214-702-00	METAL	75	1%	1/4W	
R102	1-249-405-11	CARBON	100	5%	1/4W	
R103	1-249-399-11	CARBON	33	5%	1/4W	
R104	1-249-393-11	CARBON	10	5%	1/4W	
R105	1-249-417-11	CARBON	1K	5%	1/4W	
R106	1-249-399-11	CARBON	33	5%	1/4W	
R107	1-249-388-11	CARBON	3.9	5%	1/4W	
R108	1-249-388-11	CARBON	3.9	5%	1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R109	1-249-399-11	CARBON	33	5%	1/4W	
R110	1-215-419-00	METAL	820	1%	1/6W	
R111	1-249-421-11	CARBON	2.2K	5%	1/4W	
R113	1-215-425-00	METAL	1.5K	1%	1/6W	
R114	1-214-905-00	METAL	47K	1%	1/2W	
R115	1-214-768-00	METAL	43K	1%	1/4W	
R116	1-214-768-00	METAL	43K	1%	1/4W	
R117	1-249-399-11	CARBON	33	5%	1/4W	
R118	1-249-433-11	CARBON	22K	5%	1/4W	
R119	1-249-429-11	CARBON	10K	5%	1/4W	
R120	1-216-426-11	METAL OXIDE	82	5%	1W	F
R121	1-249-400-11	CARBON	39	5%	1/4W	
R122	1-249-400-11	CARBON	39	5%	1/4W	
R123	1-215-865-11	METAL OXIDE	220	5%	1W	F
R124	1-249-400-11	CARBON	39	5%	1/4W	
R125	1-249-400-11	CARBON	39	5%	1/4W	
R126	1-202-553-00	SOLID	150	10%	1/2W	
R127	1-249-435-11	CARBON	33K	5%	1/4W	
R128	1-249-433-11	CARBON	22K	5%	1/4W	
R129	1-249-430-11	CARBON	12K	5%	1/4W	
R130	1-249-433-11	CARBON	22K	5%	1/4W	
R131	1-249-403-11	CARBON	68	5%	1/4W	
R132	1-249-405-11	CARBON	100	5%	1/4W	
R133	1-249-405-11	CARBON	100	5%	1/4W	
R134	1-215-405-00	METAL	220	1%	1/6W	
R135	1-215-401-11	METAL	150	1%	1/6W	
R201	1-214-702-00	METAL	75	1%	1/4W	
R202	1-249-405-11	CARBON	100	5%	1/4W	
R203	1-249-399-11	CARBON	33	5%	1/4W	
R204	1-249-393-11	CARBON	10	5%	1/4W	
R205	1-249-417-11	CARBON	1K	5%	1/4W	
R206	1-249-399-11	CARBON	33	5%	1/4W	
R207	1-249-388-11	CARBON	3.9	5%	1/4W	
R208	1-249-388-11	CARBON	3.9	5%	1/4W	
R209	1-249-399-11	CARBON	33	5%	1/4W	
R210	1-215-419-00	METAL	820	1%	1/6W	
R211	1-249-421-11	CARBON	2.2K	5%	1/4W	
R213	1-215-425-00	METAL	1.5K	1%	1/6W	
R214	1-214-905-00	METAL	47K	1%	1/2W	
R215	1-214-768-00	METAL	43K	1%	1/4W	
R216	1-214-768-00	METAL	43K	1%	1/4W	
R217	1-249-399-11	CARBON	33	5%	1/4W	
R218	1-249-433-11	CARBON	22K	5%	1/4W	
R219	1-249-429-11	CARBON	10K	5%	1/4W	
R220	1-216-426-11	METAL OXIDE	82	5%	1W	F
R221	1-249-400-11	CARBON	39	5%	1/4W	
R222	1-249-400-11	CARBON	39	5%	1/4W	
R223	1-215-865-11	METAL OXIDE	220	5%	1W	F
R224	1-249-400-11	CARBON	39	5%	1/4W	
R225	1-249-400-11	CARBON	39	5%	1/4W	
R226	1-202-553-00	SOLID	150	10%	1/2W	
R227	1-249-435-11	CARBON	33K	5%	1/4W	
R228	1-249-433-11	CARBON	22K	5%	1/4W	
R229	1-249-430-11	CARBON	12K	5%	1/4W	
R230	1-249-433-11	CARBON	22K	5%	1/4W	
R231	1-249-403-11	CARBON	68	5%	1/4W	
R232	1-249-405-11	CARBON	100	5%	1/4W	
R233	1-249-405-11	CARBON	100	5%	1/4W	
R234	1-215-405-00	METAL	220	1%	1/6W	
R235	1-215-401-11	METAL	150	1%	1/6W	
R301	1-214-702-00	METAL	75	1%	1/4W	
R302	1-249-405-11	CARBON	100	5%	1/4W	
R303	1-249-399-11	CARBON	33	5%	1/4W	
R304	1-249-393-11	CARBON	10	5%	1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R305	1-249-417-11	CARBON	1K	5%	1/4W	
R306	1-249-399-11	CARBON	33	5%	1/4W	
R307	1-249-388-11	CARBON	3.9	5%	1/4W	
R308	1-249-388-11	CARBON	3.9	5%	1/4W	
R309	1-249-399-11	CARBON	33	5%	1/4W	
R310	1-215-419-00	METAL	820	1%	1/6W	
R311	1-249-421-11	CARBON	2.2K	5%	1/4W	
R313	1-215-425-00	METAL	1.5K	1%	1/6W	
R314	1-214-905-00	METAL	47K	1%	1/2W	
R315	1-214-768-00	METAL	43K	1%	1/4W	
R316	1-214-768-00	METAL	43K	1%	1/4W	
R317	1-249-399-11	CARBON	33	5%	1/4W	
R318	1-249-433-11	CARBON	22K	5%	1/4W	
R319	1-249-429-11	CARBON	10K	5%	1/4W	
R320	1-216-426-11	METAL OXIDE	82	5%	1W	F
R321	1-249-400-11	CARBON	39	5%	1/4W	
R322	1-249-400-11	CARBON	39	5%	1/4W	
R323	1-215-865-11	METAL OXIDE	220	5%	1W	F
R324	1-249-400-11	CARBON	39	5%	1/4W	
R325	1-249-400-11	CARBON	39	5%	1/4W	
R326	1-202-553-00	SOLID	150	10%	1/2W	
R327	1-249-435-11	CARBON	33K	5%	1/4W	
R328	1-249-433-11	CARBON	22K	5%	1/4W	
R329	1-249-430-11	CARBON	12K	5%	1/4W	
R330	1-249-433-11	CARBON	22K	5%	1/4W	
R331	1-249-403-11	CARBON	68	5%	1/4W	
R332	1-249-405-11	CARBON	100	5%	1/4W	
R333	1-249-405-11	CARBON	100	5%	1/4W	
R334	1-215-405-00	METAL	220	1%	1/6W	
R335	1-215-401-11	METAL	150	1%	1/6W	
R401	1-249-397-11	CARBON	22	5%	1/4W	
R402	1-215-431-00	METAL	2.7K	1%	1/6W	
R403	1-214-768-00	METAL	43K	1%	1/4W	
R404	1-249-405-11	CARBON	100	5%	1/4W	
R405	1-249-437-11	CARBON	47K	5%	1/4W	
R406	1-247-903-00	CARBON	1M	5%	1/4W	
R407	1-249-397-11	CARBON	22	5%	1/4W	
R408	1-215-431-00	METAL	2.7K	1%	1/6W	
R409	1-214-768-00	METAL	43K	1%	1/4W	
R410	1-249-405-11	CARBON	100	5%	1/4W	
R411	1-249-437-11	CARBON	47K	5%	1/4W	
R412	1-247-903-00	CARBON	1M	5%	1/4W	
R413	1-249-397-11	CARBON	22	5%	1/4W	
R414	1-215-431-00	METAL	2.7K	1%	1/6W	
R415	1-214-768-00	METAL	43K	1%	1/4W	
R416	1-249-405-11	CARBON	100	5%	1/4W	
R417	1-249-437-11	CARBON	47K	5%	1/4W	
R418	1-247-903-00	CARBON	1M	5%	1/4W	
R419	1-247-700-11	CARBON	100	5%	1/4W	F
R420	1-247-700-11	CARBON	100	5%	1/4W	F
R421	1-215-896-00	METAL OXIDE	4.7K	5%	2W	F
R422	1-249-405-11	CARBON	100	5%	1/4W	
R424	1-215-435-00	METAL	3.9K	1%	1/6W	
R425	1-215-421-00	METAL	1K	1%	1/6W	
R426	1-249-403-11	CARBON	68	5%	1/4W	
R427	1-215-437-00	METAL	4.7K	1%	1/6W	
R428	1-249-428-11	CARBON	8.2K	5%	1/4W	
R429	1-215-405-00	METAL	220	1%	1/6W	
R430	1-215-449-00	METAL	15K	1%	1/6W	
R431	1-249-465-11	CARBON	47K	5%	1/4W	
R432	1-247-725-11	CARBON	10K	5%	1/4W	
R433	1-247-701-11	CARBON	120	5%	1/4W	F
R701	1-215-449-00	METAL	15K	1%	1/6W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R702	1-249-429-11	CARBON	10K	5%	1/4W	
R703	1-249-441-11	CARBON	100K	5%	1/4W	
R704	1-215-429-00	METAL	2.2K	1%	1/6W	
R705	1-215-429-00	METAL	2.2K	1%	1/6W	
R706	1-215-461-00	METAL	47K	1%	1/6W	
R707	1-215-449-00	METAL	15K	1%	1/6W	
R708	1-215-449-00	METAL	15K	1%	1/6W	
R709	1-215-461-00	METAL	47K	1%	1/6W	
R710	1-215-443-00	METAL	8.2K	1%	1/6W	
R711	1-215-449-00	METAL	15K	1%	1/6W	
R712	1-215-449-00	METAL	15K	1%	1/6W	
R713	1-249-435-11	CARBON	33K	5%	1/4W	
R714	1-249-435-11	CARBON	33K	5%	1/4W	
R715	1-249-429-11	CARBON	10K	5%	1/4W	
R716	1-249-429-11	CARBON	10K	5%	1/4W	
R717	1-215-477-00	METAL	220K	1%	1/6W	
R801	1-215-449-00	METAL	15K	1%	1/6W	
R802	1-249-429-11	CARBON	10K	5%	1/4W	
R803	1-249-441-11	CARBON	100K	5%	1/4W	
R804	1-215-429-00	METAL	2.2K	1%	1/6W	
R805	1-215-429-00	METAL	2.2K	1%	1/6W	
R806	1-215-461-00	METAL	47K	1%	1/6W	
R807	1-215-449-00	METAL	15K	1%	1/6W	
R808	1-215-449-00	METAL	15K	1%	1/6W	
R809	1-215-461-00	METAL	47K	1%	1/6W	
R810	1-215-443-00	METAL	8.2K	1%	1/6W	
R811	1-215-449-00	METAL	15K	1%	1/6W	
R812	1-215-449-00	METAL	15K	1%	1/6W	
R813	1-249-435-11	CARBON	33K	5%	1/4W	
R814	1-249-435-11	CARBON	33K	5%	1/4W	
R815	1-249-429-11	CARBON	10K	5%	1/4W	
R816	1-249-429-11	CARBON	10K	5%	1/4W	
R817	1-215-477-00	METAL	220K	1%	1/6W	
R901	1-215-449-00	METAL	15K	1%	1/6W	
R902	1-249-429-11	CARBON	10K	5%	1/4W	
R903	1-249-441-11	CARBON	100K	5%	1/4W	
R904	1-215-429-00	METAL	2.2K	1%	1/6W	
R905	1-215-429-00	METAL	2.2K	1%	1/6W	
R906	1-215-461-00	METAL	47K	1%	1/6W	
R907	1-215-449-00	METAL	15K	1%	1/6W	
R908	1-215-449-00	METAL	15K	1%	1/6W	
R909	1-215-461-00	METAL	47K	1%	1/6W	
R910	1-215-443-00	METAL	8.2K	1%	1/6W	
R911	1-215-449-00	METAL	15K	1%	1/6W	
R912	1-215-449-00	METAL	15K	1%	1/6W	
R913	1-249-435-11	CARBON	33K	5%	1/4W	
R914	1-249-435-11	CARBON	33K	5%	1/4W	
R915	1-249-429-11	CARBON	10K	5%	1/4W	
R916	1-249-429-11	CARBON	10K	5%	1/4W	
R917	1-215-477-00	METAL	220K	1%	1/6W	

<VARIABLE RESISTOR>

RV101	1-237-513-21	RES, ADJ, CERMET	200
RV201	1-237-513-21	RES, ADJ, CERMET	200
RV301	1-237-513-21	RES, ADJ, CERMET	200
RV701	1-237-519-21	RES, ADJ, CERMET	20K
RV702	1-237-519-21	RES, ADJ, CERMET	20K
RV801	1-237-519-21	RES, ADJ, CERMET	20K
RV802	1-237-519-21	RES, ADJ, CERMET	20K
RV901	1-237-519-21	RES, ADJ, CERMET	20K
RV902	1-237-519-21	RES, ADJ, CERMET	20K

****

REF.NO. PART NO. DESCRIPTION REMARK

*1-617-469-11 G BOARD
****

3-701-754-00 PLATE, INSULATING
4-363-414-00 SPACER, MICA

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION			REMARK
C1	1-124-046-00	ELECT	10MF		160V
C2	1-123-334-00	ELECT	220MF	20%	25V
C3	1-123-334-00	ELECT	220MF	20%	25V
C4	1-126-103-11	ELECT	470MF	20%	16V
C5	1-126-103-11	ELECT	470MF	20%	16V
C6	1-123-334-00	ELECT	220MF	20%	25V
C7	1-123-332-00	ELECT	47MF	20%	25V
C8	1-123-334-00	ELECT	220MF	20%	25V
C9	1-123-334-00	ELECT	220MF	20%	25V
C10	1-123-334-00	ELECT	220MF	20%	25V
C11	1-130-483-00	MYLAR	0.01MF	5%	50V

<DIODE>

D1	8-719-971-20	DIODE ERC38-06
D2	8-719-911-19	DIODE 1SS119

<CONNECTOR>

G1	*1-566-055-11	PIN, CONNECTOR 3P
G2	*1-566-059-11	PIN, CONNECTOR 7P
G3	*1-566-058-11	PIN, CONNECTOR 6P
G4	*1-566-057-11	PIN, CONNECTOR 5P
G5	*1-566-055-11	PIN, CONNECTOR 3P
G6	*1-566-055-11	PIN, CONNECTOR 3P
G7	*1-566-054-11	PIN, CONNECTOR 2P
G8	*1-566-054-11	PIN, CONNECTOR 2P
G9	*1-566-055-11	PIN, CONNECTOR 3P
G10	*1-566-054-11	PIN, CONNECTOR 2P
G11	*1-566-054-11	PIN, CONNECTOR 2P

<IC>

IC1	8-759-924-12	IC LM7805CT
	2-832-007-00	BUSHING (K), INSULATING; IC1
IC2	8-759-929-62	IC LM7812CT
	2-832-007-00	BUSHING (K), INSULATING; IC2
IC3	8-759-179-12	IC UPC7912H
	2-832-007-00	BUSHING (K), INSULATING; IC3
IC4	8-749-931-22	IC SI-3122V

<TRANSISTOR>

Q1	8-729-900-63	TRANSISTOR DTA124ES
Q2	8-729-900-36	TRANSISTOR DTC124ES

<RESISTOR>

R1	1-249-417-11	CARBON	1K	5%	1/4W	
R2	1-249-405-11	CARBON	100	5%	1/4W	
R3	1-216-389-11	METAL OXIDE	1	5%	3W	F

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*1-617-465-11 CB BOARD
****

REF.NO.	PART NO.	DESCRIPTION				REMARK
	1-526-767-00	SOCKET, PICTURE TUBE				
	1-556-880-81	LEAD ASSY, HIGH-VOLTAGE				
		<CAPACITOR>				
C1	1-102-316-00	CERAMIC	15PF	5%		500V
C2	1-102-316-00	CERAMIC	15PF	5%		500V
C3	1-102-316-00	CERAMIC	15PF	5%		500V
C4	1-162-114-00	CERAMIC	0.0047MF			2KV
		<CONNECTOR>				
CB1	*1-508-786-00	PIN, CONNECTOR (5MM PITCH) 2P				
CB2	*1-508-784-00	PIN, CONNECTOR (5MM PITCH) 1P				
CB4	*1-566-056-11	PIN, CONNECTOR 4P				
CB5	*1-566-056-11	PIN, CONNECTOR 4P				
CB6	*1-566-056-11	PIN, CONNECTOR 4P				
CB7	*1-566-055-11	PIN, CONNECTOR 3P				
CB8	*1-566-054-11	PIN, CONNECTOR 2P				
		<COIL>				
L1	1-408-107-00	INDUCTOR	1.5UH			
L2	1-408-107-00	INDUCTOR	1.5UH			
L3	1-408-107-00	INDUCTOR	1.5UH			
		<NEON LAMP>				
NL1	1-519-013-13	DISCHARGE TUBE				
NL2	1-519-013-13	DISCHARGE TUBE				
NL3	1-519-013-13	DISCHARGE TUBE				
NL4	1-519-013-13	DISCHARGE TUBE				
NL5	1-519-013-13	DISCHARGE TUBE				
NL6	1-519-013-13	DISCHARGE TUBE				
		<RESISTOR>				
R1	1-247-706-11	SOLID	330	10%	1/4W	
R2	1-247-706-11	SOLID	330	10%	1/4W	
R3	1-247-706-11	SOLID	330	10%	1/4W	
R4	1-247-721-11	SOLID	4.7K	10%	1/4W	
R5	1-247-721-11	SOLID	4.7K	10%	1/4W	
R6	1-247-721-11	SOLID	4.7K	10%	1/4W	
R7	1-246-543-00	SOLID	820K	10%	1/4W	
R9	1-202-838-00	SOLID	100K	10%	1/2W	
R10	1-202-525-00	SOLID	10	10%	1/2W	
R12	1-247-694-11	SOLID	33	10%	1/4W	
R13	1-247-694-11	SOLID	33	10%	1/4W	
R14	1-247-694-11	SOLID	33	10%	1/4W	
		<SPARK GAP>				
SG1	1-519-063-99	DISCHARGING GAP				

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*A-1345-912-A DB BOARD, COMPLETE
****

REF.NO.	PART NO.	DESCRIPTION			REMARK
		<CAPACITOR>			
C1	1-102-978-00	CERAMIC	220PF	5%	50V
C2	1-102-978-00	CERAMIC	220PF	5%	50V
C3	1-102-978-00	CERAMIC	220PF	5%	50V
C4	1-136-153-00	FILM	0.01MF	5%	50V
C5	1-136-161-00	FILM	0.047MF	5%	50V
C6	1-102-978-00	CERAMIC	220PF	5%	50V
C7	1-130-871-11	FILM	0.01MF	5%	50V
C8	1-123-369-00	ELECT	4.7MF	20%	50V
C9	1-130-471-00	FILM	0.001MF	5%	50V
C10	1-123-356-00	ELECT	10MF	20%	50V
C11	1-123-369-00	ELECT	4.7MF	20%	50V
C12	1-123-356-00	ELECT	10MF	20%	50V
C13	1-136-173-00	FILM	0.47MF	5%	50V
C14	1-136-155-00	FILM	0.015MF	5%	50V
C15	1-123-333-00	ELECT	100MF	20%	16V
C16	1-136-153-00	FILM	0.01MF	5%	50V
C17	1-136-153-00	FILM	0.01MF	5%	50V
C18	1-136-157-00	FILM	0.022MF	5%	50V
C19	1-123-381-00	ELECT	2.2MF	20%	50V
C20	1-130-726-00	FILM	0.0015MF	5%	50V
C21	1-123-356-00	ELECT	10MF	20%	50V
C22	1-102-973-00	CERAMIC	100PF	5%	50V
C23	1-102-973-00	CERAMIC	100PF	5%	50V
C24	1-130-471-00	MYLAR	0.001MF	5%	50V
C25	1-136-153-00	FILM	0.01MF	5%	50V
C26	1-102-978-00	CERAMIC	220PF	5%	50V
C27	1-130-475-00	MYLAR	0.0022MF	5%	50V
C28	1-136-153-00	FILM	0.01MF	5%	50V
C29	1-102-978-00	CERAMIC	220PF	5%	50V
C30	1-101-361-00	CERAMIC	150PF	5%	50V
C31	1-123-332-00	ELECT	47MF	20%	16V
C32	1-136-161-00	FILM	0.047MF	5%	50V
C33	1-102-973-00	CERAMIC	100PF	5%	50V
C34	1-136-161-00	FILM	0.047MF	5%	50V
C35	1-136-161-00	FILM	0.047MF	5%	50V
C36	1-102-978-00	CERAMIC	220PF	5%	50V
C37	1-136-161-00	FILM	0.047MF	5%	50V
C38	1-130-473-00	MYLAR	0.0015MF	5%	50V
C39	1-101-880-00	CERAMIC	47PF	5%	50V
C40	1-136-161-00	FILM	0.047MF	5%	50V
C41	1-102-973-00	CERAMIC	100PF	5%	50V
C42	1-136-161-00	FILM	0.047MF	5%	50V
C43	1-136-161-00	FILM	0.047MF	5%	50V
C44	1-102-978-00	CERAMIC	220PF	5%	50V
C45	1-136-161-00	FILM	0.047MF	5%	50V
C46	1-130-473-00	MYLAR	0.0015MF	5%	50V
C47	1-101-880-00	CERAMIC	47PF	5%	50V
C48	1-123-333-00	ELECT	100MF	20%	16V
C49	1-136-161-00	FILM	0.047MF	5%	50V
C50	1-102-978-00	CERAMIC	220PF	5%	50V
C51	1-136-161-00	FILM	0.047MF	5%	50V
C52	1-136-161-00	FILM	0.047MF	5%	50V
C53	1-102-820-00	CERAMIC	330PF	5%	50V
C54	1-136-161-00	FILM	0.047MF	5%	50V
C55	1-130-473-00	MYLAR	0.0015MF	5%	50V
C56	1-101-880-00	CERAMIC	47PF	5%	50V
C57	1-136-161-00	FILM	0.047MF	5%	50V
C58	1-102-978-00	CERAMIC	220PF	5%	50V
C59	1-123-333-00	ELECT	100MF	20%	16V
C60	1-136-161-00	FILM	0.047MF	5%	50V
C61	1-136-161-00	FILM	0.047MF	5%	50V
C62	1-102-820-00	CERAMIC	330PF	5%	50V
C63	1-136-161-00	FILM	0.047MF	5%	50V
C64	1-130-473-00	MYLAR	0.0015MF	5%	50V
C65	1-101-880-00	CERAMIC	47PF	5%	50V
C66	1-123-333-00	ELECT	100MF	20%	16V
C67	1-123-333-00	ELECT	100MF	20%	16V

DB

REF.NO.	PART NO.	DESCRIPTION	REMARK
C68	1-102-973-00	CERAMIC 100PF 5% 50V	
C69	1-123-333-00	ELECT 100MF 20% 16V	
C70	1-101-004-00	CERAMIC 0.01MF 50V	
C72	1-123-333-00	ELECT 100MF 20% 16V	
C73	1-123-333-00	ELECT 100MF 20% 16V	
C74	1-123-333-00	ELECT 100MF 20% 16V	
C76	1-130-473-00	MYLAR 0.0015MF 5% 50V	
C78	1-123-333-00	ELECT 100MF 20% 16V	
C79	1-136-153-00	FILM 0.01MF 5% 50V	
C80	1-123-356-00	ELECT 10MF 20% 50V	
C81	1-101-004-00	CERAMIC 0.01MF 50V	
C82	1-123-332-00	ELECT 47MF 20% 16V	
C83	1-123-333-00	ELECT 100MF 20% 16V	
C84	1-102-820-00	CERAMIC 330PF 5% 50V	
C85	1-102-973-00	CERAMIC 100PF 5% 50V	
		<DIODE>	
D1	8-719-911-19	DIODE 1SS119	
D2	8-719-109-81	DIODE RD4.7ES-B2	
D3	8-719-109-81	DIODE RD4.7ES-B2	
D4	8-719-911-19	DIODE 1SS119	
D5	8-719-911-19	DIODE 1SS119	
D6	8-719-911-19	DIODE 1SS119	
D7	8-719-911-19	DIODE 1SS119	
D8	8-719-911-19	DIODE 1SS119	
		<CONNECTOR>	
DB1	*1-566-055-11	PIN, CONNECTOR 3P	
DB2	*1-566-060-11	PIN, CONNECTOR 8P	
DB3	*1-566-060-11	PIN, CONNECTOR 8P	
DB4	*1-566-054-11	PIN, CONNECTOR 2P	
DB5	*1-566-061-11	PIN, CONNECTOR 9P	
DB6	*1-566-056-11	PIN, CONNECTOR 4P	
DB7	*1-566-055-11	PIN, CONNECTOR 3P	
DB8	*1-566-054-11	PIN, CONNECTOR 2P	
DB9	*1-566-060-11	PIN, CONNECTOR 8P	
		<IC>	
IC1	8-759-131-11	IC UPC311C	
IC2	8-759-131-11	IC UPC311C	
IC3	8-759-100-60	IC UPC1377C	
IC4	8-759-981-64	IC LM2903DQ	
IC5	8-759-945-58	IC RC4558P	
IC6	8-759-945-58	IC RC4558P	
IC7	8-759-109-82	IC UPC814C	
IC8	8-759-040-53	IC MC14053BCP	
IC9	8-759-109-82	IC UPC814C	
		<COIL>	
L1	1-408-239-00	INDUCTOR 4.7MMH	
L2	1-408-237-00	INDUCTOR 3.3MMH	
L3	1-408-237-00	INDUCTOR 3.3MMH	
L4	1-408-237-00	INDUCTOR 3.3MMH	
L5	1-408-237-00	INDUCTOR 3.3MMH	
L6	1-408-227-00	INDUCTOR 470UH	
L7	1-408-227-00	INDUCTOR 470UH	
		<TRANSISTOR>	
Q1	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q2	8-729-119-78	TRANSISTOR 2SC2785-HFE	

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q3	8-729-201-05	TRANSISTOR 2SC2878-B	
Q4	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q5	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q6	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q7	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q8	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q9	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q10	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q11	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q12	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q13	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q14	8-729-201-05	TRANSISTOR 2SC2878-B	
Q15	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q16	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q17	8-729-105-73	TRANSISTOR 2SK523-L2	
Q18	8-729-201-05	TRANSISTOR 2SC2878-B	
Q19	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q20	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q21	8-729-105-73	TRANSISTOR 2SK523-L2	
Q22	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q24	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q25	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q26	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q27	8-729-105-73	TRANSISTOR 2SK523-L2	
Q28	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q29	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q30	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q31	8-729-105-73	TRANSISTOR 2SK523-L2	
Q32	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q33	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q34	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q35	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q36	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q37	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q38	8-729-119-76	TRANSISTOR 2SA1175-HFE	
		<RESISTOR>	
R1	1-249-425-11	CARBON 4.7K 5% 1/4W	
R2	1-249-417-11	CARBON 1K 5% 1/4W	
R3	1-249-431-11	CARBON 15K 5% 1/4W	
R4	1-249-425-11	CARBON 4.7K 5% 1/4W	
R5	1-249-429-11	CARBON 10K 5% 1/4W	
R6	1-249-417-11	CARBON 1K 5% 1/4W	
R7	1-249-425-11	CARBON 4.7K 5% 1/4W	
R8	1-249-417-11	CARBON 1K 5% 1/4W	
R9	1-249-417-11	CARBON 1K 5% 1/4W	
R10	1-249-437-11	CARBON 47K 5% 1/4W	
R11	1-249-417-11	CARBON 1K 5% 1/4W	
R12	1-249-417-11	CARBON 1K 5% 1/4W	
R13	1-249-425-11	CARBON 4.7K 5% 1/4W	
R14	1-249-429-11	CARBON 10K 5% 1/4W	
R15	1-249-417-11	CARBON 1K 5% 1/4W	
R16	1-249-429-11	CARBON 10K 5% 1/4W	
R17	1-247-895-00	CARBON 470K 5% 1/4W	
R18	1-249-417-11	CARBON 1K 5% 1/4W	
R19	1-249-432-11	CARBON 18K 5% 1/4W	
R20	1-249-429-11	CARBON 10K 5% 1/4W	
R21	1-249-417-11	CARBON 1K 5% 1/4W	
R22	1-249-426-11	CARBON 5.6K 5% 1/4W	
R23	1-249-429-11	CARBON 10K 5% 1/4W	
R24	1-249-430-11	CARBON 12K 5% 1/4W	
R25	1-249-430-11	CARBON 12K 5% 1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R26	1-249-433-11	CARBON	22K	5%	1/4W	
R27	1-249-438-11	CARBON	56K	5%	1/4W	
R28	1-249-429-11	CARBON	10K	5%	1/4W	
R29	1-249-429-11	CARBON	10K	5%	1/4W	
R30	1-249-433-11	CARBON	22K	5%	1/4W	
R31	1-249-417-11	CARBON	1K	5%	1/4W	
R32	1-249-417-11	CARBON	1K	5%	1/4W	
R33	1-249-440-11	CARBON	82K	5%	1/4W	
R34	1-249-440-11	CARBON	82K	5%	1/4W	
R35	1-249-423-11	CARBON	3.3K	5%	1/4W	
R36	1-247-868-11	CARBON	36K	5%	1/4W	
R37	1-249-429-11	CARBON	10K	5%	1/4W	
R38	1-249-417-11	CARBON	1K	5%	1/4W	
R39	1-249-429-11	CARBON	10K	5%	1/4W	
R40	1-249-429-11	CARBON	10K	5%	1/4W	
R41	1-249-429-11	CARBON	10K	5%	1/4W	
R42	1-249-425-11	CARBON	4.7K	5%	1/4W	
R43	1-249-417-11	CARBON	1K	5%	1/4W	
R44	1-249-425-11	CARBON	4.7K	5%	1/4W	
R45	1-249-431-11	CARBON	15K	5%	1/4W	
R46	1-249-417-11	CARBON	1K	5%	1/4W	
R47	1-249-429-11	CARBON	10K	5%	1/4W	
R48	1-249-425-11	CARBON	4.7K	5%	1/4W	
R49	1-249-425-11	CARBON	4.7K	5%	1/4W	
R50	1-249-425-11	CARBON	4.7K	5%	1/4W	
R51	1-249-425-11	CARBON	4.7K	5%	1/4W	
R52	1-249-425-11	CARBON	4.7K	5%	1/4W	
R53	1-249-421-11	CARBON	2.2K	5%	1/4W	
R54	1-249-429-11	CARBON	10K	5%	1/4W	
R55	1-249-420-11	CARBON	1.8K	5%	1/4W	
R56	1-249-420-11	CARBON	1.8K	5%	1/4W	
R57	1-249-429-11	CARBON	10K	5%	1/4W	
R58	1-249-429-11	CARBON	10K	5%	1/4W	
R59	1-249-425-11	CARBON	4.7K	5%	1/4W	
R60	1-249-435-11	CARBON	33K	5%	1/4W	
R61	1-249-441-11	CARBON	100K	5%	1/4W	
R62	1-249-417-11	CARBON	1K	5%	1/4W	
R63	1-249-437-11	CARBON	47K	5%	1/4W	
R64	1-249-417-11	CARBON	1K	5%	1/4W	
R65	1-247-895-00	CARBON	470K	5%	1/4W	
R66	1-249-421-11	CARBON	2.2K	5%	1/4W	
R67	1-249-417-11	CARBON	1K	5%	1/4W	
R68	1-249-417-11	CARBON	1K	5%	1/4W	
R69	1-249-429-11	CARBON	10K	5%	1/4W	
R70	1-249-429-11	CARBON	10K	5%	1/4W	
R71	1-249-421-11	CARBON	2.2K	5%	1/4W	
R72	1-249-433-11	CARBON	22K	5%	1/4W	
R73	1-249-417-11	CARBON	1K	5%	1/4W	
R74	1-249-441-11	CARBON	100K	5%	1/4W	
R75	1-249-417-11	CARBON	1K	5%	1/4W	
R76	1-247-895-00	CARBON	470K	5%	1/4W	
R77	1-249-421-11	CARBON	2.2K	5%	1/4W	
R78	1-249-421-11	CARBON	2.2K	5%	1/4W	
R79	1-249-405-11	CARBON	100	5%	1/4W	
R80	1-249-417-11	CARBON	1K	5%	1/4W	
R81	1-249-433-11	CARBON	22K	5%	1/4W	
R82	1-249-435-11	CARBON	33K	5%	1/4W	
R83	1-249-425-11	CARBON	4.7K	5%	1/4W	
R84	1-249-425-11	CARBON	4.7K	5%	1/4W	
R85	1-249-413-11	CARBON	470	5%	1/4W	
R86	1-249-421-11	CARBON	2.2K	5%	1/4W	
R87	1-249-433-11	CARBON	22K	5%	1/4W	
R88	1-247-895-00	CARBON	470K	5%	1/4W	
R89	1-249-429-11	CARBON	10K	5%	1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R90	1-247-895-00	CARBON	470K	5%	1/4W	
R91	1-249-405-11	CARBON	100	5%	1/4W	
R92	1-249-417-11	CARBON	1K	5%	1/4W	
R93	1-249-433-11	CARBON	22K	5%	1/4W	
R94	1-249-435-11	CARBON	33K	5%	1/4W	
R95	1-249-425-11	CARBON	4.7K	5%	1/4W	
R96	1-249-425-11	CARBON	4.7K	5%	1/4W	
R97	1-249-413-11	CARBON	470	5%	1/4W	
R98	1-249-425-11	CARBON	4.7K	5%	1/4W	
R99	1-249-433-11	CARBON	22K	5%	1/4W	
R100	1-247-895-00	CARBON	470K	5%	1/4W	
R101	1-249-429-11	CARBON	10K	5%	1/4W	
R102	1-247-895-00	CARBON	470K	5%	1/4W	
R103	1-249-405-11	CARBON	100	5%	1/4W	
R104	1-249-417-11	CARBON	1K	5%	1/4W	
R105	1-249-433-11	CARBON	22K	5%	1/4W	
R106	1-249-425-11	CARBON	4.7K	5%	1/4W	
R107	1-249-435-11	CARBON	33K	5%	1/4W	
R108	1-249-425-11	CARBON	4.7K	5%	1/4W	
R109	1-249-425-11	CARBON	4.7K	5%	1/4W	
R110	1-249-421-11	CARBON	2.2K	5%	1/4W	
R111	1-249-413-11	CARBON	470	5%	1/4W	
R112	1-249-421-11	CARBON	2.2K	5%	1/4W	
R113	1-249-433-11	CARBON	22K	5%	1/4W	
R114	1-249-417-11	CARBON	1K	5%	1/4W	
R115	1-247-895-00	CARBON	470K	5%	1/4W	
R116	1-247-895-00	CARBON	470K	5%	1/4W	
R117	1-249-405-11	CARBON	100	5%	1/4W	
R118	1-249-433-11	CARBON	22K	5%	1/4W	
R119	1-249-425-11	CARBON	4.7K	5%	1/4W	
R120	1-249-417-11	CARBON	1K	5%	1/4W	
R121	1-249-435-11	CARBON	33K	5%	1/4W	
R122	1-249-425-11	CARBON	4.7K	5%	1/4W	
R123	1-249-421-11	CARBON	2.2K	5%	1/4W	
R124	1-249-413-11	CARBON	470	5%	1/4W	
R125	1-249-421-11	CARBON	2.2K	5%	1/4W	
R126	1-249-433-11	CARBON	22K	5%	1/4W	
R127	1-249-417-11	CARBON	1K	5%	1/4W	
R128	1-247-895-00	CARBON	470K	5%	1/4W	
R129	1-247-895-00	CARBON	470K	5%	1/4W	
R130	1-249-405-11	CARBON	100	5%	1/4W	
R131	1-215-437-00	METAL	4.7K	1%	1/6W	
R133	1-249-429-11	CARBON	10K	5%	1/4W	
R134	1-249-393-11	CARBON	10	5%	1/4W	F
R135	1-249-393-11	CARBON	10	5%	1/4W	F
R136	1-249-429-11	CARBON	10K	5%	1/4W	
R137	1-215-397-00	METAL	100	1%	1/6W	
R138	1-215-437-00	METAL	4.7K	1%	1/6W	
R139	1-215-437-00	METAL	4.7K	1%	1/6W	
R140	1-215-461-00	METAL	47K	1%	1/6W	
R141	1-249-425-11	CARBON	4.7K	5%	1/4W	
R142	1-249-417-11	CARBON	1K	5%	1/4W	
R143	1-249-405-11	CARBON	100	5%	1/4W	
R144	1-249-405-11	CARBON	100	5%	1/4W	
R145	1-249-421-11	CARBON	2.2K	5%	1/4W	
R146	1-249-417-11	CARBON	1K	5%	1/4W	
R147	1-249-417-11	CARBON	1K	5%	1/4W	
R148	1-249-425-11	CARBON	4.7K	5%	1/4W	
R149	1-249-423-11	CARBON	3.3K	5%	1/4W	
R150	1-249-421-11	CARBON	2.2K	5%	1/4W	
R151	1-249-417-11	CARBON	1K	5%	1/4W	
R152	1-249-417-11	CARBON	1K	5%	1/4W	
R153	1-249-417-11	CARBON	1K	5%	1/4W	

DB **E**

REF.NO.	PART NO.	DESCRIPTION				REMARK
R155	1-249-429-11	CARBON	10K	5%	1/4W	
R156	1-215-421-00	METAL	1K	1%	1/6W	
R157	1-249-429-11	CARBON	10K	5%	1/4W	
R158	1-215-437-00	METAL	4.7K	1%	1/6W	
R159	1-249-425-11	CARBON	4.7K	5%	1/4W	
R160	1-215-437-00	METAL	4.7K	1%	1/6W	
R161	1-249-421-11	CARBON	2.2K	5%	1/4W	
R162	1-215-453-00	METAL	22K	1%	1/6W	
R163	1-249-429-11	CARBON	10K	5%	1/4W	
R164	1-215-445-00	METAL	10K	1%	1/6W	
R165	1-215-445-00	METAL	10K	1%	1/6W	
R166	1-215-445-00	METAL	10K	1%	1/6W	
R167	1-249-425-11	CARBON	4.7K	5%	1/4W	
R168	1-249-425-11	CARBON	4.7K	5%	1/4W	

<VARIABLE RESISTOR>

REF.NO.	PART NO.	DESCRIPTION
RV1	1-237-518-21	RES, ADJ, CERMET 10K
RV2	1-237-517-21	RES, ADJ, CERMET 5K

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*A-1345-913-A E BOARD, COMPLETE
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PART NO.	DESCRIPTION
3-701-609-00	BUSHING (B), TR
*4-028-047-01	HEAT SINK, CLIP TYPE
4-303-844-00	SPACER, MICA (4) MD-17
*4-304-469-00	HOLDER
*4-347-706-00	HEAT SINK (TR)
*4-363-404-00	HOLDER, IC
4-363-414-00	SPACER, MICA
*4-373-965-01	INSULATOR (SMALL)
*4-373-966-01	INSULATOR (LARGE)

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION			REMARK
C1	1-126-103-11	ELECT	470MF	20%	16V
C2	1-123-024-21	ELECT	33MF		160V
C3	1-123-332-00	ELECT	47MF	20%	25V
C4	1-102-125-00	CERAMIC	0.0047MF	10%	50V
C5	1-102-824-00	CERAMIC	470PF	5%	50V
C6	1-108-690-11	MYLAR	0.0068MF	10%	200V
C7	1-124-360-00	ELECT	1000MF	20%	16V
C8	1-108-626-11	MYLAR	0.01MF	10%	100V
C9	1-108-634-11	MYLAR	0.047MF	10%	100V
C11	1-136-964-11	FILM	220000000QP	3%	1.4KV
C12	1-124-046-00	ELECT	10MF		160V
C13	1-123-333-00	ELECT	100MF	20%	16V
C14	1-123-333-00	ELECT	100MF	20%	16V
C15	1-108-692-11	MYLAR	0.01MF	10%	200V
C16	1-136-111-00	FILM	1MF	5%	200V
C17	1-130-485-00	MYLAR	0.015MF	5%	50V
C18	1-130-483-00	MYLAR	0.01MF	5%	50V
C19	1-102-030-00	CERAMIC	330PF	10%	500V
C20	1-136-111-00	FILM	1MF	5%	200V
C21	1-108-812-11	MYLAR	0.047MF	5%	50V
C22	1-126-105-11	ELECT	1000MF	20%	35V
C23	1-123-267-00	ELECT	2.2MF	20%	160V
C24	1-108-690-11	MYLAR	0.0068MF	10%	200V
C25	1-136-108-00	FILM	0.43MF	5%	200V
C26	1-126-105-11	ELECT	1000MF	20%	35V
C27	1-123-947-00	ELECT	10MF	20%	250V
C28	1-123-947-00	ELECT	10MF	20%	250V
C29	1-108-688-11	MYLAR	0.0047MF	10%	200V
C30	1-162-115-00	CERAMIC	330PF	10%	2KV
C31	1-124-046-00	ELECT	10MF		160V
C32	1-123-332-00	ELECT	47MF	20%	25V
C33	1-123-356-00	ELECT	10MF	20%	50V
C34	1-123-356-00	ELECT	10MF	20%	50V
C35	1-123-932-00	ELECT	4.7MF	20%	160V
C36	1-102-973-00	CERAMIC	100PF	5%	50V
C37	1-108-812-11	MYLAR	0.047MF	5%	50V
C38	1-102-947-00	CERAMIC	10PF	0.5PF	50V
C39	1-124-912-11	ELECT	330MF	20%	50V
C40	1-124-912-11	ELECT	330MF	20%	50V
C41	1-126-101-11	ELECT	100MF	20%	10V
C42	1-108-792-11	MYLAR	0.001MF	5%	50V
C43	1-108-812-11	MYLAR	0.047MF	5%	50V
C44	1-126-103-11	ELECT	470MF	20%	16V
C45	1-102-228-00	CERAMIC	470PF	10%	500V
C46	1-102-038-00	CERAMIC	0.001MF		500V
C47	1-136-080-00	FILM	0.011MF	3%	2KV
C48	1-136-111-00	FILM	1MF	5%	200V
C49	1-108-812-11	MYLAR	0.047MF	5%	50V
C50	1-136-111-00	FILM	1MF	5%	200V
C51	1-123-024-21	ELECT	33MF		160V
C52	1-126-103-11	ELECT	470MF	20%	16V
C53	1-124-634-11	ELECT	1MF	20%	450V
C54	1-124-798-11	ELECT	1MF	20%	160V
C55	1-124-798-11	ELECT	1MF	20%	160V
C56	1-108-794-11	MYLAR	0.0015MF	5%	50V
C57	1-136-153-00	FILM	0.01MF	5%	50V
C58	1-123-332-00	ELECT	47MF	20%	25V
C59	1-108-796-11	MYLAR	0.0022MF	5%	50V
C60	1-136-153-00	FILM	0.01MF	5%	50V
C61	1-101-004-00	CERAMIC	0.01MF		50V
C62	1-108-792-11	MYLAR	0.001MF	5%	50V
C63	1-102-973-00	CERAMIC	100PF	5%	50V
C64	1-102-824-00	CERAMIC	470PF	5%	50V
C65	1-123-356-00	ELECT	10MF	20%	50V
C66	1-123-357-00	ELECT	22MF	20%	50V
C67	1-123-369-00	ELECT	4.7MF	20%	50V
C68	1-123-380-00	ELECT	1MF	20%	50V
C69	1-123-356-00	ELECT	10MF	20%	50V
C70	1-123-356-00	ELECT	10MF	20%	50V
C71	1-123-381-00	ELECT	2.2MF	20%	50V
C72	1-102-824-00	CERAMIC	470PF	5%	50V
C73	1-136-171-00	FILM	0.33MF	5%	50V
C74	1-123-333-00	ELECT	100MF	20%	16V
C75	1-101-004-00	CERAMIC	0.01MF		50V
C76	1-123-357-00	ELECT	22MF	20%	50V
C77	1-123-333-00	ELECT	100MF	20%	16V
C78	1-123-369-00	ELECT	4.7MF	20%	25V
C79	1-108-638-11	MYLAR	0.1MF	10%	100V
C80	1-123-380-00	ELECT	1MF	20%	50V
C81	1-123-332-00	ELECT	47MF	20%	16V
C82	1-102-074-00	CERAMIC	0.001MF	10%	50V
C83	1-136-165-00	FILM	0.1MF	5%	50V
C84	1-123-321-00	ELECT	220MF	20%	16V
C85	1-136-165-00	FILM	0.1MF	5%	50V
C90	1-108-700-11	MYLAR	0.047MF	10%	200V
C94	1-126-103-11	ELECT	470MF	20%	16V
C95	1-162-318-11	CERAMIC	0.001MF	10%	500V
C96	1-123-335-00	ELECT	330MF	20%	25V
C97	1-123-333-00	ELECT	100MF	20%	16V

<DIODE>

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
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REF.NO.	PART NO.	DESCRIPTION	REMARK
D1	8-719-911-19	DIODE 1SS119	
D2	8-719-300-76	DIODE RH-1A	
D3	8-719-300-76	DIODE RH-1A	
D4	8-719-945-81	DIODE ERC06-15SA	
D5	8-719-945-81	DIODE ERC06-15SA	
D6	8-719-971-20	DIODE ERC38-06	
D7	8-719-971-20	DIODE ERC38-06	
D8	8-719-911-19	DIODE 1SS119	
D9	8-719-911-19	DIODE 1SS119	
D10	8-719-911-19	DIODE 1SS119	
D11	8-719-911-19	DIODE 1SS119	
D12	8-719-911-19	DIODE 1SS119	
D13	8-719-300-76	DIODE RH-1A	
D14	8-719-300-76	DIODE RH-1A	
D15	8-719-000-28	THYRISTOR CR02AM-8	
D16	8-719-931-04	DIODE ERD31-04	
D17	8-719-931-04	DIODE ERD31-04	
D18	8-719-971-20	DIODE ERC38-06	
D19	8-719-971-20	DIODE ERC38-06	
D20	8-719-971-20	DIODE ERC38-06	
D21	8-719-911-19	DIODE 1SS119	
D22	8-719-911-19	DIODE 1SS119	
D23	8-719-911-19	DIODE 1SS119	
D24	8-719-911-19	DIODE 1SS119	
D25	8-719-911-19	DIODE 1SS119	
D26	8-719-931-04	DIODE ERD31-04	
D27	8-719-931-04	DIODE ERD31-04	
D28	8-719-300-76	DIODE RH-1A	
D29	8-719-928-08	DIODE ERD28-08S	
D30	8-719-928-08	DIODE ERD28-08S	
D31	8-719-918-78	DIODE V19GF1	
D32	8-719-918-78	DIODE V19GF1	
D33	8-759-157-40	IC UPC574J	
D34	8-759-157-40	IC UPC574J	
D35	8-759-157-40	IC UPC574J	
D36	8-759-157-40	IC UPC574J	
D37	8-719-911-19	DIODE 1SS119	
D38	8-719-911-19	DIODE 1SS119	
D39	8-759-157-40	IC UPC574J	
⧓D40	⚠.	IC	
D41	8-719-911-19	DIODE 1SS119	
D42	8-719-911-19	DIODE 1SS119	
D43	8-719-911-19	DIODE 1SS119	
D44	8-719-911-19	DIODE 1SS119	
D45	8-719-000-28	THYRISTOR CR02AM-8	
D46	8-719-971-20	DIODE ERC38-06	
D47	8-719-911-19	DIODE 1SS119	
D48	8-719-101-61	DIODE RD6.2E-L2	
D50	8-719-300-76	DIODE RH-1A	
D51	8-719-101-76	DIODE RD10E-L2	
D52	8-719-101-76	DIODE RD10E-L2	
D53	8-719-911-19	DIODE 1SS119	
D54	8-719-911-19	DIODE 1SS119	
D55	8-719-931-04	DIODE ERD31-04	
D56	8-719-301-25	DIODE CTL-22S	
D57	8-769-330-03	THYRISTOR SG-264A	
D59	8-719-110-13	DIODE RD9.1ES-B2	

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
E1	*1-566-058-11	PIN, CONNECTOR 6P	
E2	*1-566-056-11	PIN, CONNECTOR 4P	
E3	*1-566-055-11	PIN, CONNECTOR 3P	
E4	*1-508-767-00	PIN, CONNECTOR (5MM PITCH) 5P	
E5	*1-508-767-00	PIN, CONNECTOR (5MM PITCH) 5P	
E6	*1-508-784-00	PIN, CONNECTOR (5MM PITCH) 1P	
E7	*1-508-766-00	PIN, CONNECTOR (5MM PITCH) 4P	
E8	*1-566-054-11	PIN, CONNECTOR 2P	
E9	*1-566-054-11	PIN, CONNECTOR 2P	
E10	*1-566-055-11	PIN, CONNECTOR 3P	
E11	*1-566-056-11	PIN, CONNECTOR 4P	
E12	*1-566-054-11	PIN, CONNECTOR 2P	
E13	*1-566-054-11	PIN, CONNECTOR 2P	
E14	*1-508-766-00	PIN, CONNECTOR (5MM PITCH) 4P	
E15	*1-566-055-11	PIN, CONNECTOR 3P	
E16	*1-566-054-11	PIN, CONNECTOR 2P	
E17	*1-566-059-11	PIN, CONNECTOR 7P	
E18	*1-566-055-11	PIN, CONNECTOR 3P	

<IC>

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC1	8-759-945-58	IC RC4558P	
IC2	8-759-981-64	IC LM2903DQ	
IC3	8-759-945-58	IC RC4558P	
IC4	8-759-981-64	IC LM2903DQ	
IC5	8-759-981-64	IC LM2903DQ	
IC6	8-759-981-64	IC LM2903DQ	

<COIL>

REF.NO.	PART NO.	DESCRIPTION	REMARK
L1	1-459-148-00	COIL	
L2	1-459-308-32	COIL; HORIZONTAL LINEARITY	
L3	1-459-075-00	COIL,DYNAMIC CONVERSION CHOKE	
L5	1-421-603-11	COIL, FERRITE CHOKE	
L6	1-407-365-00	COIL,CHOKE	
L7	1-459-110-00	COIL,DUST CORE	

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q1	8-729-119-80	TRANSISTOR 2SC2688-LK	
Q2	8-729-304-26	TRANSISTOR 2SC3263-O	
Q3	8-729-119-80	TRANSISTOR 2SC2688-LK	
Q4	8-729-320-62	TRANSISTOR 2SD789-34	
Q5	8-729-232-01	TRANSISTOR 2SC4532	
Q6	8-729-300-70	TRANSISTOR 2SD1137	
Q7	8-729-300-80	TRANSISTOR 2SB860	
Q8	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q9	8-729-697-92	TRANSISTOR 2SA979-G	
Q10	8-729-309-08	TRANSISTOR 2SC1890A-E	
Q11	8-729-300-70	TRANSISTOR 2SD1137	
Q12	8-729-309-08	TRANSISTOR 2SC1890A-E	
Q13	8-729-309-36	TRANSISTOR 2SA893A-EV	
Q14	8-729-300-80	TRANSISTOR 2SB860	
Q15	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q16	8-729-800-32	TRANSISTOR 2SC2362K-G	
Q17	8-729-800-32	TRANSISTOR 2SC2362K-G	
Q18	8-729-309-08	TRANSISTOR 2SC1890A-E	
Q19	8-729-306-92	TRANSISTOR 2SD669A-C	
Q20	8-729-309-36	TRANSISTOR 2SA893A-EV	
Q21	8-729-306-92	TRANSISTOR 2SD669A-C	
Q22	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q23	8-729-697-92	TRANSISTOR 2SA979-G	
Q25	8-729-306-92	TRANSISTOR 2SD669A-C	
Q26	8-729-309-08	TRANSISTOR 2SC1890A-E	
Q27	8-729-309-36	TRANSISTOR 2SA893A-EV	
Q28	8-729-306-92	TRANSISTOR 2SD669A-C	
Q29	8-729-119-76	TRANSISTOR 2SA1175-HFE	

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E

REF.NO.	PART NO.	DESCRIPTION				REMARK
Q30	8-729-320-62	TRANSISTOR 2SD789-34				
Q31	8-729-301-56	TRANSISTOR 2SC3387-01AB				
Q32	8-729-374-02	TRANSISTOR 2SB740-3				
Q33	8-729-105-97	TRANSISTOR 2SA1156-2K				
Q34	8-729-119-80	TRANSISTOR 2SC2688-LK				
Q35	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q36	8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q37	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q38	8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q39	8-729-119-76	TRANSISTOR 2SA1175-HFE				
		<RESISTOR>				
R1	1-214-769-00	METAL	47K	1%	1/4W	
R2	1-214-769-00	METAL	47K	1%	1/4W	
R3	1-249-469-11	CARBON	100K	5%	1/4W	
R4	1-247-708-11	CARBON	470	5%	1/4W	
R5	1-247-713-11	CARBON	1K	5%	1/4W	
R6	1-247-713-11	CARBON	1K	5%	1/4W	
R7	1-215-875-11	METAL OXIDE	10K	5%	1W	F
R8	1-215-876-00	METAL OXIDE	15K	5%	1W	F
R9	1-214-892-00	METAL	15K	1%	1/2W	
R10	1-214-892-00	METAL	15K	1%	1/2W	
R11	1-214-742-00	METAL	3.6K	1%	1/4W	
R12	1-247-700-11	CARBON	100	5%	1/4W	
R13	1-247-721-11	CARBON	4.7K	5%	1/4W	
R14	1-247-721-11	CARBON	4.7K	5%	1/4W	
R15	1-215-887-00	METAL OXIDE	150	5%	2W	F
R16	1-247-708-11	CARBON	470	5%	1/4W	
R17	1-216-353-00	METAL OXIDE	2.2	5%	1W	F
R18	1-249-389-11	CARBON	4.7	5%	1/4W	F
R19	1-249-382-11	CARBON	1.2	5%	1/4W	F
R20	1-249-382-11	CARBON	1.2	5%	1/4W	F
R21	1-247-713-11	CARBON	1K	5%	1/4W	
R22	1-247-713-11	CARBON	1K	5%	1/4W	
R23	1-216-357-00	METAL OXIDE	4.7	5%	1W	F
R24	1-216-357-00	METAL OXIDE	4.7	5%	1W	F
R25	1-215-864-00	METAL OXIDE	150	5%	1W	F
R26	1-216-476-11	METAL OXIDE	180	5%	3W	F
R27	1-249-423-11	CARBON	3.3K	5%	1/4W	
R28	1-249-425-11	CARBON	4.7K	5%	1/4W	
R29	1-249-419-11	CARBON	1.5K	5%	1/4W	
R30	1-215-433-00	METAL	3.3K	1%	1/6W	
R31	1-215-445-00	METAL	10K	1%	1/6W	
R32	1-247-713-11	CARBON	1K	5%	1/4W	
R33	1-247-713-11	CARBON	1K	5%	1/4W	
R34	1-215-437-00	METAL	4.7K	1%	1/6W	
R35	1-247-701-11	CARBON	120	5%	1/4W	
R36	1-216-464-11	METAL OXIDE	18K	5%	2W	F
R37	1-247-700-11	CARBON	100	5%	1/4W	
R38	1-249-377-11	CARBON	0.47	5%	1/4W	F
R39	1-249-377-11	CARBON	0.47	5%	1/4W	F
R40	1-247-713-11	CARBON	1K	5%	1/4W	
R41	1-247-708-11	CARBON	470	5%	1/4W	
R42	1-216-349-00	METAL OXIDE	1	5%	1W	F
R43	1-215-859-00	METAL OXIDE	22	5%	1W	F
R44	1-215-869-11	METAL OXIDE	1K	5%	1W	F
R45	1-215-869-11	METAL OXIDE	1K	5%	1W	F
R46	1-215-889-00	METAL OXIDE	330	5%	2W	F
R47	1-215-869-11	METAL OXIDE	1K	5%	1W	F
R48	1-215-425-00	METAL	1.5K	1%	1/6W	
R49	1-216-349-00	METAL OXIDE	1	5%	1W	F
R50	1-215-437-00	METAL	4.7K	1%	1/6W	
R51	1-216-349-00	METAL OXIDE	1	5%	1W	F
R52	1-247-725-11	CARBON	10K	5%	1/4W	
R53	1-246-544-00	CARBON	910K	5%	1/4W	
R54	1-247-883-00	CARBON	150K	5%	1/4W	
R55	1-249-462-11	CARBON	22K	5%	1/4W	
R56	1-247-716-11	CARBON	1.8K	5%	1/4W	
R57	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R58	1-249-468-11	CARBON	82K	5%	1/4W	
R59	1-247-717-11	CARBON	2.2K	5%	1/4W	
R60	1-247-713-11	CARBON	1K	5%	1/4W	
R61	1-247-713-11	CARBON	1K	5%	1/4W	
R62	1-215-863-11	METAL OXIDE	100	5%	1W	F
R63	1-214-729-00	METAL	1K	1%	1/4W	
R64	1-214-753-00	METAL	10K	1%	1/4W	
R65	1-247-716-11	CARBON	1.8K	5%	1/4W	
R66	1-216-441-00	METAL OXIDE	27K	5%	1W	F
R67	1-247-696-11	CARBON	47	5%	1/4W	
R68	1-247-721-11	CARBON	4.7K	5%	1/4W	
R69	1-214-769-00	METAL	47K	1%	1/4W	
R70	1-214-761-00	METAL	22K	1%	1/4W	
R71	1-214-737-00	METAL	2.2K	1%	1/4W	
R72	1-247-688-11	CARBON	10	5%	1/4W	F
R73	1-247-688-11	CARBON	10	5%	1/4W	F
R74	1-247-688-11	CARBON	10	5%	1/4W	F
R75	1-247-719-11	CARBON	3.3K	5%	1/4W	
R76	1-247-721-11	CARBON	4.7K	5%	1/4W	
R77	1-247-713-11	CARBON	1K	5%	1/4W	
R78	1-214-745-00	METAL	4.7K	1%	1/4W	
R79	1-214-745-00	METAL	4.7K	1%	1/4W	
R80	1-247-713-11	CARBON	1K	5%	1/4W	
R81	1-247-713-11	CARBON	1K	5%	1/4W	
R82	1-247-700-11	CARBON	100	5%	1/4W	
R83	1-247-717-11	CARBON	2.2K	5%	1/4W	
R84	1-247-717-11	CARBON	2.2K	5%	1/4W	
R85	1-249-386-11	CARBON	2.7	5%	1/4W	F
R86	1-249-386-11	CARBON	2.7	5%	1/4W	F
R87	1-215-863-11	METAL OXIDE	100	5%	1W	F
R88	1-216-349-00	METAL OXIDE	1	5%	1W	F
R89	1-216-353-00	METAL OXIDE	2.2	5%	1W	F
R90	1-216-353-00	METAL OXIDE	2.2	5%	1W	F
R91	1-247-881-00	CARBON	120K	5%	1/4W	
R92	1-247-721-11	CARBON	4.7K	5%	1/4W	
R93	1-247-713-11	CARBON	1K	5%	1/4W	
R94	1-247-717-11	CARBON	2.2K	5%	1/4W	
R95	1-247-725-11	CARBON	10K	5%	1/4W	
R96	1-247-713-11	CARBON	1K	5%	1/4W	
R97	1-247-717-11	CARBON	2.2K	5%	1/4W	
R98	1-247-717-11	CARBON	2.2K	5%	1/4W	
R99	1-247-717-11	CARBON	2.2K	5%	1/4W	
R100	1-247-695-11	CARBON	39	5%	1/4W	
R101	1-247-713-11	CARBON	1K	5%	1/4W	
R102	1-215-887-00	METAL OXIDE	150	5%	2W	F
R103	1-247-717-11	CARBON	2.2K	5%	1/4W	
R104	1-216-355-11	METAL OXIDE	3.3	5%	1W	F
R105	1-215-860-11	METAL OXIDE	33	5%	1W	F
R106	1-215-863-11	METAL OXIDE	100	5%	1W	F
R107	1-215-863-11	METAL OXIDE	100	5%	1W	F
R108	1-216-345-11	METAL OXIDE	0.47	5%	1W	F
R109	1-212-936-00	FUSIBLE	1.2	5%	1/2W	F
R110	1-215-877-11	METAL OXIDE	22K	5%	1W	F
R111	1-216-461-00	METAL OXIDE	5.6K	5%	2W	F
R112	1-247-700-11	CARBON	100	5%	1/4W	
R113	1-247-725-11	CARBON	10K	5%	1/4W	
R114	1-214-761-00	METAL	22K	1%	1/4W	
☒R115 ⚠		METAL			1/4W	

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E **DA**

REF.NO.	PART NO.	DESCRIPTION				REMARK
R116	1-214-753-00	METAL	10K	1%	1/4W	
R117	1-247-717-11	CARBON	2.2K	5%	1/4W	
R118	1-247-725-11	CARBON	10K	5%	1/4W	
R119	1-247-883-00	CARBON	150K	5%	1/4W	
R120	1-247-713-11	CARBON	1K	5%	1/4W	
R121	1-247-721-11	CARBON	4.7K	5%	1/4W	
R122	1-247-717-11	CARBON	2.2K	5%	1/4W	
R123	1-249-462-11	CARBON	22K	5%	1/4W	
R124	1-247-717-11	CARBON	2.2K	5%	1/4W	
R125	1-249-469-11	CARBON	100K	5%	1/4W	
R126	1-247-721-11	CARBON	4.7K	5%	1/4W	
R127	1-247-721-11	CARBON	4.7K	5%	1/4W	
R128	1-247-725-11	CARBON	10K	5%	1/4W	
R129	1-215-874-11	METAL OXIDE	6.8K	5%	1W	F
R130	1-216-437-00	METAL OXIDE	5.6K	5%	1W	F
R131	1-215-874-11	METAL OXIDE	6.8K	5%	1W	F
R132	1-216-437-00	METAL OXIDE	5.6K	5%	1W	F
R133	1-247-713-11	CARBON	1K	5%	1/4W	
R134 ⚠	1-214-747-51	METAL	5.6K	1%	1/4W	
R135 ⚠	1-214-747-51	METAL	5.6K	1%	1/4W	
R136 ⚠	1-214-747-51	METAL	5.6K	1%	1/4W	
R137	1-214-769-00	METAL	47K	1%	1/4W	
R138	1-247-713-11	CARBON	1K	5%	1/4W	
R139	1-249-417-11	CARBON	1K	5%	1/4W	
☒R140 ⚠		METAL			1/4W	
☒R141 ⚠		METAL			1/4W	
R142	1-247-887-00	CARBON	220K	5%	1/4W	
R143	1-247-887-00	CARBON	220K	5%	1/4W	
R144	1-214-753-00	METAL	10K	1%	1/4W	
R145	1-249-469-11	CARBON	100K	5%	1/4W	
R146	1-247-713-11	CARBON	1K	5%	1/4W	
R147	1-249-467-11	CARBON	68K	5%	1/4W	
R148	1-249-465-11	CARBON	47K	5%	1/4W	
R149	1-247-722-11	CARBON	5.6K	5%	1/4W	
R150	1-247-717-11	CARBON	2.2K	5%	1/4W	
R151	1-247-726-11	CARBON	33K	5%	1/4W	
R152	1-247-713-11	CARBON	1K	5%	1/4W	
R153	1-247-895-00	CARBON	470K	5%	1/4W	
R154	1-247-725-11	CARBON	10K	5%	1/4W	
R155	1-214-785-00	METAL	220K	1%	1/4W	
R156	1-214-787-00	METAL	270K	1%	1/4W	
R157	1-249-465-11	CARBON	47K	5%	1/4W	
R158	1-246-531-00	CARBON	270K	5%	1/4W	
R161	1-247-725-11	CARBON	10K	5%	1/4W	
R165	1-247-700-11	CARBON	100	5%	1/4W	
R170	1-247-713-11	CARBON	1K	5%	1/4W	
R171	1-247-725-11	CARBON	10K	5%	1/4W	
R172	1-247-700-11	CARBON	100	5%	1/4W	
R173	1-249-429-11	CARBON	10K	5%	1/4W	
R174	1-215-859-00	METAL OXIDE	22	5%	1W	F
R175	1-249-417-11	CARBON	1K	5%	1/4W	
R176	1-249-417-11	CARBON	1K	5%	1/4W	
R177	1-247-713-11	CARBON	1K	5%	1/4W	

<VARIABLE RESISTOR>

RV1	1-224-250-99	RES, ADJ, METAL GLAZE 2.2K
RV2	1-237-516-21	RES, ADJ, CERMET 2K

<SPARK GAP>

SG1	1-519-063-99	DISCHARGING GAP

REF.NO.	PART NO.	DESCRIPTION	REMARK

<TRANSFORMER>

T1	1-421-608-00	TRANSFORMER, FERRITE (CDT)
T2	1-439-320-00	TRANSFORMER, FERRITE (HOT)
T3	1-421-602-11	TRANSFORMER, FERRITE (VPCT)
T4	1-407-849-00	TRANSFORMER, D.F
T5	1-437-133-11	TRANSFORMER, FERRITE (HDT)
T6	1-439-380-11	LOT

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*A-1345-914-A DA BOARD, COMPLETE
****

<CAPACITOR>

C1	1-102-976-00	CERAMIC	180PF	5%	50V
C2	1-102-074-00	CERAMIC	0.001MF	10%	50V
C3	1-130-871-11	FILM	0.01MF	5%	50V
C4	1-136-153-00	FILM	0.01MF	5%	50V
C5	1-124-589-11	ELECT	47MF	20%	16V
C6	1-124-589-11	ELECT	47MF	20%	16V
C7	1-101-004-00	CERAMIC	0.01MF		50V
C8	1-130-871-11	FILM	0.01MF	5%	50V
C10	1-101-004-00	CERAMIC	0.01MF		50V
C11	1-124-589-11	ELECT	47MF	20%	16V
C12	1-124-589-11	ELECT	47MF	20%	16V
C13	1-124-589-11	ELECT	47MF	20%	16V
C14	1-124-589-11	ELECT	47MF	20%	16V
C15	1-136-474-11	FILM	0.1MF	5%	100V
C16	1-130-871-11	FILM	0.01MF	5%	50V
C17	1-130-871-11	FILM	0.01MF	5%	50V
C18	1-124-589-11	ELECT	47MF	20%	16V
C19	1-124-589-11	ELECT	47MF	20%	16V
C20	1-102-973-00	CERAMIC	100PF	5%	50V
C21	1-136-153-00	FILM	0.01MF	5%	50V
C22	1-101-004-00	CERAMIC	0.01MF		50V
C23	1-126-096-11	ELECT	10MF	20%	25V
C24	1-102-973-00	CERAMIC	100PF	5%	50V
C25	1-102-973-00	CERAMIC	100PF	5%	50V
C26	1-101-004-00	CERAMIC	0.01MF		50V
C27	1-102-973-00	CERAMIC	100PF	5%	50V
C28	1-130-471-00	MYLAR	0.001MF	5%	50V
C29	1-126-160-11	ELECT	1MF	20%	50V
C30	1-130-471-00	MYLAR	0.001MF	5%	50V
C31	1-101-004-00	CERAMIC	0.01MF		50V
C32	1-102-114-00	CERAMIC	470PF	10%	50V
C33	1-102-114-00	CERAMIC	470PF	10%	50V
C34	1-126-160-11	ELECT	1MF	20%	50V
C35	1-126-096-11	ELECT	10MF	20%	25V
C36	1-124-589-11	ELECT	47MF	20%	16V
C37	1-124-589-11	ELECT	47MF	20%	16V
C38	1-126-096-11	ELECT	10MF	20%	25V
C39	1-124-589-11	ELECT	47MF	20%	16V
C40	1-124-589-11	ELECT	47MF	20%	16V
C41	1-124-589-11	ELECT	47MF	20%	16V
C42	1-126-096-11	ELECT	10MF	20%	25V
C43	1-102-976-00	CERAMIC	180PF	5%	50V
C44	1-130-471-00	MYLAR	0.001MF	5%	50V
C45	1-136-161-00	FILM	0.047MF	5%	50V
C46	1-136-165-00	FILM	0.1MF	5%	50V
C47	1-101-004-00	CERAMIC	0.01MF		50V

DA

REF.NO.	PART NO.	DESCRIPTION	REMARK
		<DIODE>	
D1	8-719-911-19	DIODE 1SS119	
D2	8-719-109-81	DIODE RD4.7ES-B2	
D3	8-719-911-19	DIODE 1SS119	
D4	8-719-911-19	DIODE 1SS119	
		<CONNECTOR>	
DA1	*1-566-056-11	PIN, CONNECTOR 4P	
DA2	*1-566-060-11	PIN, CONNECTOR 8P	
DA3	*1-566-054-11	PIN, CONNECTOR 2P	
DA4	*1-566-057-11	PIN, CONNECTOR 5P	
DA5	*1-566-055-11	PIN, CONNECTOR 3P	
DA6	*1-566-060-11	PIN, CONNECTOR 8P	
		<IC>	
IC1	8-759-131-11	IC UPC311C	
IC2	8-759-945-58	IC RC4558P	
IC3	8-759-945-58	IC RC4558P	
IC4	8-759-040-53	IC MC14053BCP	
IC5	8-759-945-58	IC RC4558P	
IC6	8-759-945-58	IC RC4558P	
IC7	8-759-945-58	IC RC4558P	
IC8	8-759-131-11	IC UPC311C	
IC9	8-759-990-82	IC TL082CP	
IC10	8-759-945-58	IC RC4558P	
IC11	8-759-014-96	IC MC1496P	
		<COIL>	
L1	1-408-240-00	INDUCTOR 6.8MMH	
L2	1-408-429-00	INDUCTOR 470UH	
		<TRANSISTOR>	
Q1	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q2	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q3	8-729-201-05	TRANSISTOR 2SC2878-B	
Q4	8-729-201-05	TRANSISTOR 2SC2878-B	
Q5	8-729-201-05	TRANSISTOR 2SC2878-B	
Q6	8-729-201-05	TRANSISTOR 2SC2878-B	
Q7	8-729-201-05	TRANSISTOR 2SC2878-B	
Q8	8-729-201-05	TRANSISTOR 2SC2878-B	
Q9	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q10	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q11	8-729-201-05	TRANSISTOR 2SC2878-B	
Q12	8-729-201-05	TRANSISTOR 2SC2878-B	
Q13	8-729-201-05	TRANSISTOR 2SC2878-B	
Q14	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q15	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q16	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q17	8-729-320-62	TRANSISTOR 2SD789-34	
Q18	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q19	8-729-119-78	TRANSISTOR 2SC2785-HFE	
		<RESISTOR>	
R1	1-249-425-11	CARBON 4.7K 5% 1/4W	
R2	1-249-429-11	CARBON 10K 5% 1/4W	
R3	1-249-417-11	CARBON 1K 5% 1/4W	
R4	1-249-425-11	CARBON 4.7K 5% 1/4W	
R5	1-249-417-11	CARBON 1K 5% 1/4W	
R6	1-249-420-11	CARBON 1.8K 5% 1/4W	

REF.NO.	PART NO.	DESCRIPTION	REMARK
R7	1-215-453-00	METAL 22K 1% 1/6W	
R8	1-215-451-00	METAL 18K 1% 1/6W	
R9	1-249-437-11	CARBON 47K 5% 1/4W	
R10	1-247-895-00	CARBON 470K 5% 1/4W	
R11	1-249-437-11	CARBON 47K 5% 1/4W	
R12	1-249-429-11	CARBON 10K 5% 1/4W	
R13	1-215-445-00	METAL 10K 1% 1/6W	
R14	1-215-445-00	METAL 10K 1% 1/6W	
R15	1-215-461-00	METAL 47K 1% 1/6W	
R16	1-249-429-11	CARBON 10K 5% 1/4W	
R17	1-215-485-00	METAL 470K 1% 1/6W	
R18	1-249-437-11	CARBON 47K 5% 1/4W	
R19	1-249-441-11	CARBON 100K 5% 1/4W	
R20	1-215-445-00	METAL 10K 1% 1/6W	
R21	1-249-417-11	CARBON 1K 5% 1/4W	
R22	1-215-421-00	METAL 1K 1% 1/6W	
R23	1-215-421-00	METAL 1K 1% 1/6W	
R24	1-215-421-00	METAL 1K 1% 1/6W	
R25	1-215-421-00	METAL 1K 1% 1/6W	
R26	1-215-453-00	METAL 22K 1% 1/6W	
R27	1-249-437-11	CARBON 47K 5% 1/4W	
R28	1-249-441-11	CARBON 100K 5% 1/4W	
R29	1-215-445-00	METAL 10K 1% 1/6W	
R30	1-215-445-00	METAL 10K 1% 1/6W	
R31	1-215-445-00	METAL 10K 1% 1/6W	
R32	1-215-445-00	METAL 10K 1% 1/6W	
R33	1-249-417-11	CARBON 1K 5% 1/4W	
R34	1-249-417-11	CARBON 1K 5% 1/4W	
R35	1-249-417-11	CARBON 1K 5% 1/4W	
R36	1-249-417-11	CARBON 1K 5% 1/4W	
R37	1-215-447-00	METAL 12K 1% 1/6W	
R38	1-215-445-00	METAL 10K 1% 1/6W	
R39	1-215-461-00	METAL 47K 1% 1/6W	
R40	1-215-445-00	METAL 10K 1% 1/6W	
R41	1-215-445-00	METAL 10K 1% 1/6W	
R42	1-249-435-11	CARBON 33K 5% 1/4W	
R43	1-249-405-11	CARBON 100 5% 1/4W	
R44	1-249-429-11	CARBON 10K 5% 1/4W	
R45	1-215-445-00	METAL 10K 1% 1/6W	
R46	1-215-485-00	METAL 470K 1% 1/6W	
R47	1-249-429-11	CARBON 10K 5% 1/4W	
R48	1-249-437-11	CARBON 47K 5% 1/4W	
R49	1-249-441-11	CARBON 100K 5% 1/4W	
R50	1-249-405-11	CARBON 100 5% 1/4W	
R52	1-249-429-11	CARBON 10K 5% 1/4W	
R54	1-249-429-11	CARBON 10K 5% 1/4W	
R55	1-215-481-00	METAL 330K 1% 1/6W	
R56	1-215-481-00	METAL 330K 1% 1/6W	
R57	1-249-437-11	CARBON 47K 5% 1/4W	
R58	1-249-441-11	CARBON 100K 5% 1/4W	
R59	1-249-433-11	CARBON 22K 5% 1/4W	
R60	1-215-445-00	METAL 10K 1% 1/6W	
R61	1-215-469-00	METAL 100K 1% 1/6W	
R62	1-215-445-00	METAL 10K 1% 1/6W	
R63	1-215-445-00	METAL 10K 1% 1/6W	
R64	1-215-457-00	METAL 33K 1% 1/6W	
R65	1-215-441-00	METAL 6.8K 1% 1/6W	
R67	1-249-429-11	CARBON 10K 5% 1/4W	
R68	1-215-457-00	METAL 33K 1% 1/6W	
R69	1-215-447-00	METAL 12K 1% 1/6W	
R70	1-249-433-11	CARBON 22K 5% 1/4W	
R71	1-215-457-00	METAL 33K 1% 1/6W	
R72	1-215-447-00	METAL 12K 1% 1/6W	
R73	1-249-405-11	CARBON 100 5% 1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R74	1-249-425-11	CARBON	4.7K	5%	1/4W	
R75	1-249-431-11	CARBON	15K	5%	1/4W	
R76	1-215-421-00	METAL	1K	1%	1/6W	
R77	1-215-452-00	METAL	20K	1%	1/6W	
R78	1-249-417-11	CARBON	1K	5%	1/4W	
R79	1-247-895-00	CARBON	470K	5%	1/4W	
R80	1-249-421-11	CARBON	2.2K	5%	1/4W	
R81	1-249-435-11	CARBON	33K	5%	1/4W	
R82	1-249-423-11	CARBON	3.3K	5%	1/4W	
R83	1-249-429-11	CARBON	10K	5%	1/4W	
R84	1-249-429-11	CARBON	10K	5%	1/4W	
R85	1-215-461-00	METAL	47K	1%	1/6W	
R86	1-249-433-11	CARBON	22K	5%	1/4W	
R87	1-249-429-11	CARBON	10K	5%	1/4W	
R88	1-215-441-00	METAL	6.8K	1%	1/6W	
R89	1-249-429-11	CARBON	10K	5%	1/4W	
R90	1-215-457-00	METAL	33K	1%	1/6W	
R91	1-249-433-11	CARBON	22K	5%	1/4W	
R92	1-249-435-11	CARBON	33K	5%	1/4W	
R93	1-215-461-00	METAL	47K	1%	1/6W	
R94	1-215-469-00	METAL	100K	1%	1/6W	
R95	1-249-429-11	CARBON	10K	5%	1/4W	
R96	1-249-417-11	CARBON	1K	5%	1/4W	
R97	1-249-433-11	CARBON	22K	5%	1/4W	
R98	1-249-437-11	CARBON	47K	5%	1/4W	
R99	1-249-425-11	CARBON	4.7K	5%	1/4W	
R100	1-215-453-00	METAL	22K	1%	1/6W	
R101	1-249-409-11	CARBON	220	5%	1/4W	
R102	1-249-417-11	CARBON	1K	5%	1/4W	
R103	1-249-409-11	CARBON	220	5%	1/4W	
R104	1-249-430-11	CARBON	12K	5%	1/4W	
R105	1-249-401-11	CARBON	47	5%	1/4W	
R106	1-249-417-11	CARBON	1K	5%	1/4W	
R107	1-249-417-11	CARBON	1K	5%	1/4W	
R108	1-249-425-11	CARBON	4.7K	5%	1/4W	
R109	1-249-425-11	CARBON	4.7K	5%	1/4W	
R110	1-249-417-11	CARBON	1K	5%	1/4W	
R111	1-249-433-11	CARBON	22K	5%	1/4W	
R113	1-249-441-11	CARBON	100K	5%	1/4W	
R114	1-249-401-11	CARBON	47	5%	1/4W	
R115	1-249-401-11	CARBON	47	5%	1/4W	
R120	1-249-405-11	CARBON	100	5%	1/4W	
R121	1-249-417-11	CARBON	1K	5%	1/4W	
R122	1-249-429-11	CARBON	10K	5%	1/4W	
R123	1-249-429-11	CARBON	10K	5%	1/4W	
R124	1-249-425-11	CARBON	4.7K	5%	1/4W	
R125	1-249-413-11	CARBON	470	5%	1/4W	
R126	1-249-420-11	CARBON	1.8K	5%	1/4W	
R127	1-249-425-11	CARBON	4.7K	5%	1/4W	
R128	1-249-429-11	CARBON	10K	5%	1/4W	
R129	1-249-417-11	CARBON	1K	5%	1/4W	
R130	1-249-425-11	CARBON	4.7K	5%	1/4W	
R131	1-249-429-11	CARBON	10K	5%	1/4W	
R132	1-249-405-11	CARBON	100	5%	1/4W	

<VARIABLE RESISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
RV1	1-237-512-21	RES, ADJ, CERMET 100	
RV2	1-237-517-21	RES, ADJ, CERMET 5K	
RV3	1-237-519-21	RES, ADJ, CERMET 20K	
RV4	1-237-518-21	RES, ADJ, CERMET 10K	
RV5	1-237-518-21	RES, ADJ, CERMET 10K	
RV6	1-237-519-21	RES, ADJ, CERMET 20K	
RV7	1-237-519-21	RES, ADJ, CERMET 20K	
RV8	1-237-517-21	RES, ADJ, CERMET 5K	
RV9	1-237-519-21	RES, ADJ, CERMET 20K	
RV10	1-237-517-21	RES, ADJ, CERMET 5K	
RV11	1-237-519-21	RES, ADJ, CERMET 20K	
RV12	1-237-518-21	RES, ADJ, CERMET 10K	
RV13	1-237-518-21	RES, ADJ, CERMET 10K	
RV14	1-237-519-21	RES, ADJ, CERMET 20K	
RV15	1-237-519-21	RES, ADJ, CERMET 20K	
RV16	1-237-519-21	RES, ADJ, CERMET 20K	
RV17	1-237-519-21	RES, ADJ, CERMET 20K	
RV18	1-237-518-21	RES, ADJ, CERMET 10K	
RV19	1-237-518-21	RES, ADJ, CERMET 10K	

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*1-617-472-11 JA BOARD
****

*4-378-902-01 HOLDER, LED

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
C101	1-126-157-11	ELECT	10MF	20%	16V	
C102	1-126-157-11	ELECT	10MF	20%	16V	
C103	1-126-157-11	ELECT	10MF	20%	16V	
C104	1-126-157-11	ELECT	10MF	20%	16V	

<DIODE>

REF.NO.	PART NO.	DESCRIPTION	REMARK
D101	8-719-938-68	DIODE GL3HY8	
D102	8-719-938-68	DIODE GL3HY8	
D103	8-719-938-68	DIODE GL3HY8	
D104	8-719-938-68	DIODE GL3HY8	
D105	8-719-911-19	DIODE 1SS119	

<IC>

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC1	8-759-240-11	IC TC4011BP	

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
JA1	*1-566-058-11	PIN, CONNECTOR 6P	
JA2	*1-566-054-11	PIN, CONNECTOR 2P	
JA3	*1-566-056-11	PIN, CONNECTOR 4P	

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q101	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q102	8-729-900-36	TRANSISTOR DTC124ES	
Q103	8-729-900-36	TRANSISTOR DTC124ES	

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
R101	1-249-428-11	CARBON	8.2K	5%	1/4W	
R102	1-249-428-11	CARBON	8.2K	5%	1/4W	
R103	1-249-428-11	CARBON	8.2K	5%	1/4W	
R104	1-249-428-11	CARBON	8.2K	5%	1/4W	
R105	1-215-425-00	METAL	1.5K	1%	1/6W	
R106	1-215-445-00	METAL	10K	1%	1/6W	
R107	1-249-429-11	CARBON	10K	5%	1/4W	
R108	1-249-405-11	CARBON	100	5%	1/4W	
R109	1-249-405-11	CARBON	100	5%	1/4W	
R110	1-249-417-11	CARBON	1K	5%	1/4W	
R111	1-249-417-11	CARBON	1K	5%	1/4W	
R112	1-249-429-11	CARBON	10K	5%	1/4W	
R113	1-249-429-11	CARBON	10K	5%	1/4W	

JA **JB** **L** **Y** **I**

<VARIABLE RESISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
RV101	1-237-519-21	RES, ADJ, CERMET 20K	
RV102	1-237-121-11	RES, VAR (CP ELEMENT) 20K	
RV103	1-237-519-21	RES, ADJ, CERMET 20K	
RV104	1-237-121-11	RES, VAR (CP ELEMENT) 20K	

<SWITCH>

REF.NO.	PART NO.	DESCRIPTION	REMARK
SW101	1-570-509-11	SWITCH, TOGGLE	
SW102	1-570-509-11	SWITCH, TOGGLE	
SW103	1-554-472-00	SWITCH, PUSH (1 KEY)	
SW104	1-554-472-00	SWITCH, PUSH (1 KEY)	
SW105	1-554-472-00	SWITCH, PUSH (1 KEY)	
SW106	1-554-472-00	SWITCH, PUSH (1 KEY)	
SW107	1-554-472-00	SWITCH, PUSH (1 KEY)	

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*1-617-473-11 JB BOARD
****

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
JB1	*1-566-054-11	PIN, CONNECTOR 2P	
JB2	*1-566-054-11	PIN, CONNECTOR 2P	
JB3	*1-566-054-11	PIN, CONNECTOR 2P	
JB4	*1-566-057-11	PIN, CONNECTOR 5P	
JB5	*1-566-054-11	PIN, CONNECTOR 2P	

<SWITCH>

REF.NO.	PART NO.	DESCRIPTION	REMARK
SW1	1-570-372-11	SWITCH, PUSH (1 KEY)	
SW2	1-554-472-00	SWITCH, PUSH (1 KEY)	
SW3	1-554-472-00	SWITCH, PUSH (1 KEY)	
SW4	1-554-472-00	SWITCH, PUSH (1 KEY)	
SW5	1-570-509-11	SWITCH, TOGGLE	

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*1-617-474-11 L BOARD
****

<DIODE>

REF.NO.	PART NO.	DESCRIPTION	REMARK
D1	8-719-920-21	DIODE LT-9220H	

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
R1	1-249-408-11	CARBON	180	5%	1/4W	

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*1-617-475-11 Y BOARD
****

*4-360-299-01 HOLDER, LED

<DIODE>

REF.NO.	PART NO.	DESCRIPTION	REMARK
D1	8-719-812-43	DIODE TLG124A	

****

*A-1375-086-A I BOARD, COMPLETE
****

REF.NO.	PART NO.	DESCRIPTION	REMARK
	*1-566-054-11	PIN, CONNECTOR 2P	
	*1-566-056-11	PIN, CONNECTOR 4P	
	*1-566-057-11	PIN, CONNECTOR 5P	
	*1-566-058-11	PIN, CONNECTOR 6P	
	*1-566-060-11	PIN, CONNECTOR 8P	
	*1-566-061-11	PIN, CONNECTOR 9P	

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION			REMARK
C1	1-124-589-11	ELECT	47MF	20%	16V
C2	1-124-589-11	ELECT	47MF	20%	16V
C3	1-124-589-11	ELECT	47MF	20%	16V
C4	1-102-074-00	CERAMIC	0.001MF	10%	50V
C5	1-124-589-11	ELECT	47MF	20%	16V
C7	1-102-074-00	CERAMIC	0.001MF	10%	50V
C8	1-102-074-00	CERAMIC	0.001MF	10%	50V
C9	1-102-074-00	CERAMIC	0.001MF	10%	50V
C10	1-124-589-11	ELECT	47MF	20%	16V
C12	1-124-589-11	ELECT	47MF	20%	16V
C13	1-102-074-00	CERAMIC	0.001MF	10%	50V
C14	1-124-589-11	ELECT	47MF	20%	16V
C17	1-124-589-11	ELECT	47MF	20%	16V
C20	1-102-074-00	CERAMIC	0.001MF	10%	50V
C101	1-102-074-00	CERAMIC	0.001MF	10%	50V
C102	1-102-074-00	CERAMIC	0.001MF	10%	50V
C103	1-102-074-00	CERAMIC	0.001MF	10%	50V
C104	1-102-074-00	CERAMIC	0.001MF	10%	50V
C105	1-102-074-00	CERAMIC	0.001MF	10%	50V
C106	1-102-074-00	CERAMIC	0.001MF	10%	50V
C107	1-102-074-00	CERAMIC	0.001MF	10%	50V
C108	1-102-074-00	CERAMIC	0.001MF	10%	50V
C109	1-102-074-00	CERAMIC	0.001MF	10%	50V
C110	1-102-074-00	CERAMIC	0.001MF	10%	50V
C111	1-102-074-00	CERAMIC	0.001MF	10%	50V
C112	1-102-074-00	CERAMIC	0.001MF	10%	50V
C113	1-102-074-00	CERAMIC	0.001MF	10%	50V
C114	1-102-074-00	CERAMIC	0.001MF	10%	50V
C115	1-102-074-00	CERAMIC	0.001MF	10%	50V
C306	1-124-589-11	ELECT	47MF	20%	16V
C307	1-102-074-00	CERAMIC	0.001MF	10%	50V
C308	1-124-589-11	ELECT	47MF	20%	16V
C309	1-102-074-00	CERAMIC	0.001MF	10%	50V
C310	1-124-589-11	ELECT	47MF	20%	16V
C311	1-102-074-00	CERAMIC	0.001MF	10%	50V
C312	1-102-074-00	CERAMIC	0.001MF	10%	50V
C313	1-124-589-11	ELECT	47MF	20%	16V
C314	1-102-074-00	CERAMIC	0.001MF	10%	50V
C315	1-124-589-11	ELECT	47MF	20%	16V
C316	1-102-074-00	CERAMIC	0.001MF	10%	50V

<DIODE>

REF.NO.	PART NO.	DESCRIPTION	REMARK
D1	8-719-812-43	DIODE TLG124A	
D2	8-719-812-43	DIODE TLG124A	
D3	8-719-812-43	DIODE TLG124A	
D4	8-719-911-19	DIODE 1SS119	

<IC>

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC1	8-759-945-58	IC RC4558P	
IC2	8-759-945-58	IC RC4558P	
IC3	8-759-945-58	IC RC4558P	
IC4	8-759-040-53	IC MC14053BCP	
IC5	8-759-945-58	IC RC4558P	

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC6	8-759-140-11	IC UPD4011BC	
IC101	8-759-040-53	IC MC14053BCP	
IC102	8-759-040-53	IC MC14053BCP	
IC103	8-759-040-53	IC MC14053BCP	
IC104	8-759-945-58	IC RC4558P	
IC105	8-759-945-58	IC RC4558P	
IC106	8-759-945-58	IC RC4558P	
IC107	8-759-945-58	IC RC4558P	
IC108	8-759-945-58	IC RC4558P	

<COIL>

REF.NO.	PART NO.	DESCRIPTION	REMARK
L301	1-410-671-31	INDUCTOR 47UH	
L302	1-410-671-31	INDUCTOR 47UH	

<TRANSISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q1	8-729-201-05	TRANSISTOR 2SC2878-B	
Q2	8-729-201-05	TRANSISTOR 2SC2878-B	
Q3	8-729-900-36	TRANSISTOR DTC124ES	
Q4	8-729-900-36	TRANSISTOR DTC124ES	
Q5	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q6	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q101	8-729-900-36	TRANSISTOR DTC124ES	
Q102	8-729-900-36	TRANSISTOR DTC124ES	
Q103	8-729-900-36	TRANSISTOR DTC124ES	
Q104	8-729-900-36	TRANSISTOR DTC124ES	
Q105	8-729-900-36	TRANSISTOR DTC124ES	
Q106	8-729-900-36	TRANSISTOR DTC124ES	

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION				REMARK
R1	1-215-445-00	METAL	10K	1%	1/6W	
R2	1-249-429-11	CARBON	10K	5%	1/4W	
R3	1-215-445-00	METAL	10K	1%	1/6W	
R4	1-249-433-11	CARBON	22K	5%	1/4W	
R5	1-249-441-11	CARBON	100K	5%	1/4W	
R6	1-249-405-11	CARBON	100	5%	1/4W	
R7	1-215-445-00	METAL	10K	1%	1/6W	
R8	1-249-417-11	CARBON	1K	5%	1/4W	
R9	1-249-429-11	CARBON	10K	5%	1/4W	
R10	1-215-445-00	METAL	10K	1%	1/6W	
R11	1-215-469-00	METAL	100K	1%	1/6W	
R12	1-249-429-11	CARBON	10K	5%	1/4W	
R13	1-215-469-00	METAL	100K	1%	1/6W	
R14	1-249-429-11	CARBON	10K	5%	1/4W	
R15	1-215-469-00	METAL	100K	1%	1/6W	
R16	1-249-429-11	CARBON	10K	5%	1/4W	
R17	1-215-469-00	METAL	100K	1%	1/6W	
R18	1-249-429-11	CARBON	10K	5%	1/4W	
R19	1-215-445-00	METAL	10K	1%	1/6W	
R20	1-215-445-00	METAL	10K	1%	1/6W	
R21	1-249-417-11	CARBON	1K	5%	1/4W	
R22	1-249-419-11	CARBON	1.5K	5%	1/4W	
R23	1-249-429-11	CARBON	10K	5%	1/4W	
R24	1-249-405-11	CARBON	100	5%	1/4W	
R25	1-249-417-11	CARBON	1K	5%	1/4W	
R26	1-249-419-11	CARBON	1.5K	5%	1/4W	
R27	1-215-453-00	METAL	22K	1%	1/6W	
R28	1-215-453-00	METAL	22K	1%	1/6W	
R29	1-215-453-00	METAL	22K	1%	1/6W	
R30	1-215-453-00	METAL	22K	1%	1/6W	
R31	1-215-453-00	METAL	22K	1%	1/6W	
R32	1-215-453-00	METAL	22K	1%	1/6W	
R33	1-215-453-00	METAL	22K	1%	1/6W	
R34	1-215-453-00	METAL	22K	1%	1/6W	
R35	1-215-453-00	METAL	22K	1%	1/6W	
R36	1-215-457-00	METAL	33K	1%	1/6W	
R37	1-215-461-00	METAL	47K	1%	1/6W	
R38	1-215-457-00	METAL	33K	1%	1/6W	
R39	1-215-457-00	METAL	33K	1%	1/6W	
R40	1-215-469-00	METAL	100K	1%	1/6W	
R41	1-215-457-00	METAL	33K	1%	1/6W	
R42	1-215-457-00	METAL	33K	1%	1/6W	
R43	1-215-461-00	METAL	47K	1%	1/6W	
R44	1-215-457-00	METAL	33K	1%	1/6W	
R45	1-215-461-00	METAL	47K	1%	1/6W	
R46	1-249-433-11	CARBON	22K	5%	1/4W	
R47	1-249-437-11	CARBON	47K	5%	1/4W	
R48	1-249-418-11	CARBON	1.2K	5%	1/4W	
R49	1-215-445-00	METAL	10K	1%	1/6W	
R50	1-249-433-11	CARBON	22K	5%	1/4W	
R51	1-249-437-11	CARBON	47K	5%	1/4W	
R52	1-215-445-00	METAL	10K	1%	1/6W	
R53	1-215-469-00	METAL	100K	1%	1/6W	
R54	1-215-469-00	METAL	100K	1%	1/6W	
R55	1-215-453-00	METAL	22K	1%	1/6W	
R56	1-249-417-11	CARBON	1K	5%	1/4W	
R57	1-215-469-00	METAL	100K	1%	1/6W	
R58	1-249-753-15	CARBON	4.7M	5%	1/4W	
R59	1-215-483-00	METAL	390K	1%	1/6W	
R60	1-249-753-15	CARBON	4.7M	5%	1/4W	
R61	1-249-435-11	CARBON	33K	5%	1/4W	
R71	1-249-429-11	CARBON	10K	5%	1/4W	
R72	1-249-429-11	CARBON	10K	5%	1/4W	
R73	1-249-429-11	CARBON	10K	5%	1/4W	
R74	1-249-429-11	CARBON	10K	5%	1/4W	
R75	1-249-429-11	CARBON	10K	5%	1/4W	
R76	1-249-437-11	CARBON	47K	5%	1/4W	
R77	1-249-437-11	CARBON	47K	5%	1/4W	
R97	1-249-417-11	CARBON	1K	5%	1/4W	
R98	1-249-405-11	CARBON	100	5%	1/4W	
R101	1-249-405-11	CARBON	100	5%	1/4W	
R102	1-249-405-11	CARBON	100	5%	1/4W	
R103	1-249-405-11	CARBON	100	5%	1/4W	
R104	1-249-405-11	CARBON	100	5%	1/4W	
R105	1-249-405-11	CARBON	100	5%	1/4W	
R106	1-249-405-11	CARBON	100	5%	1/4W	
R107	1-249-405-11	CARBON	100	5%	1/4W	
R108	1-249-405-11	CARBON	100	5%	1/4W	
R109	1-249-405-11	CARBON	100	5%	1/4W	
R110	1-249-417-11	CARBON	1K	5%	1/4W	
R111	1-249-429-11	CARBON	10K	5%	1/4W	
R112	1-249-435-11	CARBON	33K	5%	1/4W	
R113	1-249-429-11	CARBON	10K	5%	1/4W	
R114	1-249-405-11	CARBON	100	5%	1/4W	
R115	1-249-405-11	CARBON	100	5%	1/4W	
R116	1-249-405-11	CARBON	100	5%	1/4W	
R117	1-249-417-11	CARBON	1K	5%	1/4W	
R118	1-249-417-11	CARBON	1K	5%	1/4W	
R119	1-249-405-11	CARBON	100	5%	1/4W	
R120	1-249-416-11	CARBON	820	5%	1/4W	
R121	1-249-416-11	CARBON	820	5%	1/4W	
R122	1-249-416-11	CARBON	820	5%	1/4W	
R123	1-249-425-11	CARBON	4.7K	5%	1/4W	
R124	1-249-425-11	CARBON	4.7K	5%	1/4W	
R125	1-249-425-11	CARBON	4.7K	5%	1/4W	

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite. Ne les remplacer que par une piece portant le numero specifie.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION	REMARK
R126	1-249-417-11	CARBON 1K 5% 1/4W	
R127	1-249-417-11	CARBON 1K 5% 1/4W	
R128	1-249-417-11	CARBON 1K 5% 1/4W	
R129	1-249-417-11	CARBON 1K 5% 1/4W	

<VARIABLE RESISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
RV1	1-237-518-21	RES, ADJ, CERMET 10K	
RV2	1-237-518-21	RES, ADJ, CERMET 10K	
RV3	1-237-518-21	RES, ADJ, CERMET 10K	
RV4	1-237-518-21	RES, ADJ, CERMET 10K	
RV5	1-237-518-21	RES, ADJ, CERMET 10K	
RV6	1-237-518-21	RES, ADJ, CERMET 10K	
RV7	1-237-518-21	RES, ADJ, CERMET 10K	
RV8	1-237-518-21	RES, ADJ, CERMET 10K	
RV9	1-237-518-21	RES, ADJ, CERMET 10K	
RV10	1-237-518-21	RES, ADJ, CERMET 10K	
RV11	1-237-518-21	RES, ADJ, CERMET 10K	
RV12	1-237-518-21	RES, ADJ, CERMET 10K	
RV13	1-237-518-21	RES, ADJ, CERMET 10K	
RV14	1-237-518-21	RES, ADJ, CERMET 10K	
RV15	1-237-518-21	RES, ADJ, CERMET 10K	
RV16	1-237-518-21	RES, ADJ, CERMET 10K	
RV17	1-237-518-21	RES, ADJ, CERMET 10K	
RV18	1-237-518-21	RES, ADJ, CERMET 10K	
RV19	1-237-518-21	RES, ADJ, CERMET 10K	
RV20	1-237-518-21	RES, ADJ, CERMET 10K	
RV21	1-237-521-21	RES, ADJ, CERMET 100K	
RV22	1-237-518-21	RES, ADJ, CERMET 10K	
RV23	1-237-518-21	RES, ADJ, CERMET 10K	
RV101	1-237-994-11	RES, VAR, CARBON 20K	
RV111	1-237-519-21	RES, ADJ, CERMET 20K	
RV112	1-237-519-21	RES, ADJ, CERMET 20K	
RV113	1-237-519-21	RES, ADJ, CERMET 20K	
RV114	1-237-519-21	RES, ADJ, CERMET 20K	
RV115	1-237-519-21	RES, ADJ, CERMET 20K	
RV116	1-237-519-21	RES, ADJ, CERMET 20K	
RV117	1-237-519-21	RES, ADJ, CERMET 20K	
RV118	1-237-519-21	RES, ADJ, CERMET 20K	
RV119	1-237-519-21	RES, ADJ, CERMET 20K	
RV121	1-237-519-21	RES, ADJ, CERMET 20K	
RV122	1-237-519-21	RES, ADJ, CERMET 20K	
RV123	1-237-519-21	RES, ADJ, CERMET 20K	
RV124	1-237-519-21	RES, ADJ, CERMET 20K	
RV125	1-237-519-21	RES, ADJ, CERMET 20K	
RV126	1-237-519-21	RES, ADJ, CERMET 20K	
RV127	1-237-519-21	RES, ADJ, CERMET 20K	
RV128	1-237-519-21	RES, ADJ, CERMET 20K	
RV129	1-237-519-21	RES, ADJ, CERMET 20K	

<SWITCH>

REF.NO.	PART NO.	DESCRIPTION	REMARK
S1	1-570-509-11	SWITCH, TOGGLE	
S2	1-570-509-11	SWITCH, TOGGLE	
S101	1-570-509-11	SWITCH, TOGGLE	
S102	1-570-509-11	SWITCH, TOGGLE	
S103	1-570-509-11	SWITCH, TOGGLE	
S104	1-570-509-11	SWITCH, TOGGLE	
S105	1-570-509-11	SWITCH, TOGGLE	
S106	1-570-509-11	SWITCH, TOGGLE	
S107	1-572-206-11	SWITCH, PUSH (8 KEY)	

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REF.NO.	PART NO.	DESCRIPTION	REMARK
	*A-1389-709-A	XA BOARD, COMPLETE ******************	
	*1-563-164-11	CONNECTOR, MULTI (L-J) 64P	
	4-378-915-01	NUT (M2.6), PLATE	

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
XA1	*1-562-729-11	CONNECTOR, MULTI 64P	

****

REF.NO.	PART NO.	DESCRIPTION	REMARK
	*1-610-380-12	K BOARD *******	

<CAPACITOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
C1	⚠.1-162-169-12	CAP BLOCK, HIGH-VOLTAGE	
C2	1-136-106-00	FILM 0.36MF 5% 200V	

<CONNECTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
K1	*1-508-768-00	PIN, CONNECTOR (5MM PITCH) 6P	
K2	*1-508-766-00	PIN, CONNECTOR (5MM PITCH) 4P	
K3	*1-566-055-11	PIN, CONNECTOR 3P	
K4	*1-566-059-11	PIN, CONNECTOR 7P	
K5	*1-566-058-11	PIN, CONNECTOR 6P	
K6	*1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P	
K8	*1-508-784-00	PIN, CONNECTOR (5MM PITCH) 1P	

<RESISTOR>

REF.NO.	PART NO.	DESCRIPTION	REMARK
R1	1-202-818-00	SOLID 1K 10% 1/2W	

****

MISCELLANEOUS
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REF.NO.	PART NO.	DESCRIPTION	REMARK
	⚠.1-230-618-11	RESISTOR ASSY, HIGH-VOLTAGE	
	⚠.1-413-289-11	REGULATOR, SWITCHING (TK-15)	
	⚠.1-453-102-21	HIGH-VOLTAGE BLOCK (HB-202A)	
	1-533-224-11	HOLDER, FUSE (DIA. 5.2)	
	*1-555-110-00	CABLE, PIN	
	⚠.1-560-222-11	INLET 3P	
F901	⚠.1-532-350-11	FUSE, GLASS TUBE 4A/250V(HDM-1230E ONLY)	
	⚠.1-532-746-11	FUSE, GLASS TUBE 4A/125V (HDM-1230 ONLY)	
L901	⚠.1-451-285-11	DEFLECTION YOKE (Y14FAC)	
L902	⚠.1-426-263-11	COIL, DEMAGNETIZATION	
L903	⚠.1-452-117-31	PICTURE TUBE NECK ASSY	
L904	⚠.1-452-261-12	PICTURE TUBE NECK ASSY (362)	
S901	⚠.1-571-877-11	SWITCH, PUSH (AC POWER)	
S902	⚠.1-570-173-22	SWITCH, VOLTAGE CHANGE	
T901	⚠.1-439-381-21	TRANSFORMER ASSY, FLYBACK (NX-2002)	
V901	⚠.8-738-051-05	PICTURE TUBE (M34JNR20X)	

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ACCESSORIES AND PACKING MATERIALS
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PART NO.	DESCRIPTION	REMARK
⚠.1-532-350-11	FUSE, GLASS TUBE 4A/250V(HDM-1230E ONLY)	
⚠.1-532-746-11	FUSE, GLASS TUBE 4A/125V (HDM-1230 ONLY)	
⚠.1-534-819-14	CORD, POWER (HDM-1230E ONLY)	
⚠.1-551-812-11	CORD, POWER (HDM-1230 ONLY)	

REF.NO.	PART NO.	DESCRIPTION	REMARK
	1-560-776-00	SOCKET, CONNECTOR 10P	
	1-564-662-11	PLUG, BNC (75 OHM)	
	*2-990-242-01	HOLDER (B), PLUG	
	4-353-603-00	PLATE, NUMBER	
	*4-377-015-01	BAG, PROTECTION	
	4-378-901-01	KEY	
	*4-378-956-01	CUSHION (UPPER)	
	*4-378-957-01	CUSHION (LOWER)	
	*4-393-083-01	INDIVIDUAL CARTON (HDM-1230E ONLY)	
	4-393-088-02	MANUAL,OPERATION & MAINTENANCE	
	*4-393-092-01	INDIVIDUAL CARTON (HDM-1230 ONLY)	
	7-700-731-03	DRIVER, VR ADJUSTMENT	

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